

X8 (J781): 22-N4 (A.C.)
81351
INDIA, CENTRAL
COTTON COMMITTEE.
Annual report 1941.

TWENTIETH
ANNUAL REPORT
OF THE
INDIAN
CENTRAL COTTON COMMITTEE
FOR THE YEAR ENDED
31st AUGUST
1 9 4 1

Price, Rs. 2.

Cotton Ginning and Pressing Factories Act or other similar legislation in force to provide for the monthly submission of returns of cotton ginned by ginning factories. Most of the Provinces and Indian States have agreed to the Committee's proposal but it will take some time before the necessary legislation is passed. Meanwhile those States which have agreed to furnish the returns have been asked to do so with effect from the 1941-42 season. Arrangements will be made for the publication of the consolidated figures when the returns are more complete.

9. INDIAN COTTON SITUATION—1940-41.

The season started with a carryover of 19.3 lakhs bales (400 lbs. net) held by the trade and spinning mills in India. The actual crop of 1940-41, on the basis of cotton pressed and unpressed cotton consumed in mills amounted to 64.9 lakhs bales (excluding extra-factory consumption of 4.5 lakhs bales), of which 30.0 lakhs bales are estimated to have been of staple length $\frac{3}{8}$ " and above. The total supply for the season, including extra-factory consumption, was 88.7 lakhs bales, being higher than that of the previous season by nearly 12.9 lakhs bales. Out of the supply of 88.7 lakhs bales, about 38.5 lakhs bales were estimated to be of staple length $\frac{3}{8}$ " and above.

There was a spurt in the internal demand for Indian cotton, owing to restricted imports of cotton goods, and increased requirements of the Defence Services and the overseas markets. As a result, the consumption of Indian cotton by Indian mills reached the record figure of 36.2 lakhs bales, being 5.7 lakhs bales higher than that of the previous season. Out of the total consumption, 20.0 lakhs bales are estimated to have been of staple length $\frac{3}{8}$ " and above. This group accounted for nearly 55% of the increased consumption. The total mill receipts of Indian cotton during the season, on the basis of voluntary returns, amounted to 41.0 lakhs bales of 400 lbs. net, showing an increase of nearly 12.3 lakhs bales, or 43%, over the previous season. Bengals, Americans, Oomras, Central India, Southernns and other varieties accounted for 7, 30, 27, 11, 13 and 11% respectively of this increase.

As regards the position of exports, this was the first season in which there was complete cessation of exports to the Continent, which, on the average of the three seasons ending 1938-39, accounted for an annual offtake of 8.6 lakhs bales of Indian cotton, including roughly $6\frac{1}{2}$ lakhs bales of staple length below $\frac{3}{8}$ ". While the entire surplus of cotton of staple length $\frac{3}{8}$ " and

above, resulting from the loss of the Continental markets, may be said to have been absorbed by the increased consumption in this country, only two-fifths of the surplus below $\frac{7}{8}$ " in staple was so utilised. With the announcement regarding the freezing of the Japanese assets, the situation at the close of the season was overshadowed by the prospective loss of the Far Eastern market for Indian cotton. The total exports from British India during the season amounted to 20.1 lakhs bales, of which, cotton of staple length $\frac{7}{8}$ " and above formed 7.2 lakhs bales or 36%.

According to the voluntary returns, the stocks of Indian cotton held by the mills and the trade on the 31st August, 1941, amounted to 26.4 lakhs bales of 400 lbs. net, including 10.4 lakhs bales of cotton of staple length $\frac{7}{8}$ " and above, against the corresponding figures of 19.3 and 8.4 lakhs bales for the previous year. The calculated carryover on the basis of the figures of actual production, mill consumption, and exports works out to 27.9 lakhs bales as follows:—

	In lakhs of bales of 400 lbs. net. (Excludes extra-factory consumption).		
	Total.	$\frac{7}{8}$ " and above.	Below $\frac{7}{8}$ ".
Stocks held by the mills and the trade on the 31st August, 1940	19.3	8.4	10.9
Probable production in 1940-41	64.9	30.0	34.9
Total supply	84.2	38.4	45.8
Indian mill consumption in 1940-41 ..	36.2	20.0	16.2
Exports during 1940-41	20.1	7.2	12.9
Total distribution	56.3	27.2	29.1
Estimated stocks held by the mills and the trade on the 31st August, 1941 ..	27.9	11.2	16.7

10. COLLECTION OF STATISTICS OF COTTON IMPORTED INTO BOMBAY BY ROAD.

Reference was made in the last year's report to the proposal for the collection of the statistics of cotton imported into Bombay by road, through

the agency of the Bombay Port Trust in collaboration with the East India Cotton Association, the Bombay Chamber of Commerce and certain other interested parties. The proposal is dependent upon necessary legislation being passed by the Government of Bombay to empower the Bombay Port Trust with the required authority. Owing to the war, however, the position of railways vis-a-vis road transport has greatly altered and it has been decided to hold the matter in abeyance for the present.

11. PERIODICAL REVIEWS OF THE STATE OF FOREIGN TRADE IN INDIAN COTTON.

By arrangement with the Director General of Commercial Intelligence and Statistics, a clerk is employed in his office, at the Committee's expense, with the object of furnishing monthly reviews on the state of foreign trade in Indian cotton. These reviews, besides giving information on the developments in the cotton situation in general, also contain statistics relating to Indian cotton based on the British Indian trade accounts as well as on the trade accounts of the importing countries. The reviews are supplied to trade bodies represented on the Committee and to cotton spinning mills on request; they are also available to the public at a small charge.

12. IMPROVEMENT OF COTTON FORECASTS.

As usual, the all-India cotton forecasts of the 1939-40 season were subjected to a post-mortem examination by the Cotton Forecast Sub-Committee of the Indian Central Cotton Committee, at the close of the season, with a view to detecting sources of errors and suggesting remedial measures. It was decided in connection with these examinations, that if possible, the yield estimates of prominent commercial firms should be given for purposes of comparison with the official forecasts. The question of applying a correction factor to the anna valuation figures reported for Sind and the Gujerat block of the Bombay Province, to which reference was made in the previous report, was considered by the Committee and it was decided to make a general recommendation to the effect that the forecasting authorities should, in preparing the outturn figures for the forecast Reports (particularly for the April Forecast), apply their own correction factor to arrive at what might appear to them to be the most probable estimate in the light of the data available with them at the time. In the case of Sind, it was further suggested that the question of incorporating in the April Forecast Reports, a sentence to the effect that the commercial crop (the best estimate based on trade statistics)

amounted to.....bales on the average of the previous ten (or five) years against.....bales officially estimated, might be examined.

On the general question of improving cotton forecasts, several suggestions were made by the Committee during the year and the Director General of Commercial Intelligence and Statistics has been requested to examine and report on the various recommendations. It is also proposed to examine the basis of the normal anna valuation in the various Provinces and the procedure adopted in estimating the outturn in terms of arnas. In order to improve the cotton forecasts, a systematic scientific revision of the standard yield figures is considered necessary and the first essential is the devising of a proper sampling technique for obtaining the average yield. Proposals in this connection are being examined by the Committee and it is hoped shortly to devise a simple and practical scheme for obtaining this very necessary information.

As in the past, by arrangement with the Director General of Commercial Intelligence and Statistics, the estimates of the cotton crop were received by wire and released in Bombay at a time previously fixed to synchronise with the time of their release in Calcutta.

13. REPORT ON THE ACCURACY OF THE ALL-INDIA COTTON FORECASTS.

As usual, a report on the accuracy of the all-India cotton forecasts of the 1939-40 season was published in August. According to this report, the commercial crop of 1939-40 was estimated to be in the neighbourhood of 5,884,000 bales, whilst the figure forecasted in April 1940, was 4,942,000 bales. *The forecast estimate was thus lower by 16 per cent on the basis of the actual crop as arrived at by the Committee; this was probably due to the observed underestimation in the forecasts of the United Provinces, the Punjab, Sind, Bombay Province, Madras Province, Central India and Rajputana.*

14. PUBLICATIONS.

The undermentioned statistical publications were issued during the year under report :—

- (1) *Statistical Leaflet No. 2.*—Seventh Issue (1939-40), "Stocks of Indian raw cotton held in India by the mills and the trade on 31st August, 1940."

- (2) *Statistical Leaflet No. 3.*—Seventh Issue (1939-40), "Receipts at mills in India of raw cotton classified by varieties—1939-40 season."
 - (3) *Statistical Leaflet No. 4.*—Seventh Issue (1939-40), "Exports by sea of Indian raw cotton classified by varieties—1939-40 season."
 - (4) *Statistical Leaflet No. 1.*—Eighth Issue (1940-41), "Report on the staple length of the Indian cotton crop of 1940-41 season."
 - (5) *Statistical Leaflet No. 5.*—Fifth Issue (1939-40), "Report on the accuracy of the all-India cotton forecasts of 1939-40 season."
-

CHAPTER III.

RESEARCH.

Research into cotton problems of all-India importance constitutes perhaps the most important function of the Committee. A number of research schemes, among which cotton breeding schemes for the improvement of quality naturally take pride of place, are in operation in the various cotton growing Provinces and States. The majority of these schemes are financed entirely by the Committee, while the cost of others is borne partly by the Committee and partly by the Provincial Government or State concerned. The Committee also maintains a well-equipped Technological Laboratory where research on cotton technology is carried on. In addition, trained Technological Assistants are posted at the Cotton Research Stations at Lyallpur, Mirpurkhas, Cawnpore, Surat, Dharwar, Coimbatore, and Parbhani, to help the botanists in charge in their work of breeding improved varieties of cotton.

1. FUNDAMENTAL RESEARCH.

Fundamental research on cotton is carried on at the Institute of Plant Industry, Indore. This Institute was established in 1924 with the object of providing a central research station for cotton in the black soil area of the Malwa Plateau. In April 1940, the working of the Institute was re-organised, as a result of which, fundamental research on genetics, plant physiology and field plot technique is carried out under a special scheme—Cotton Genetics Research Scheme—which is financed and controlled directly by the Committee. An annual subsidy of Rs. 30,000 is, however, given to the Institute for plant breeding work on cotton and other crops for the Member States, as well as for seed multiplication, distribution and demonstration and such agronomical and chemical investigations as might be considered necessary for the benefit of the States. Last year was the first season of the working of the Institute under the new arrangement; breeding work, varietal tests and seed multiplication and distribution were carried on along the lines of the previous years and satisfactory progress was reported to have been made. An interesting investigation which deserves mention was that relating to the effect of fire-heating on the properties of black cotton soil in comparison with those of gray and humus-treated soils. Light fire-heating of the surface layers of the

black cotton soil (the *rab* process) greatly increased the crop growth and yield. Similar differences in yield were obtained by (i) surface application of gray soil which occurs naturally in many low lying areas adjoining black cotton tracts, and (ii) heavy application of humic manures throughout the profile of the black cotton soil. A study of the properties of these groups of soils was completed during the year and the results have been published. A review of the progress made in some of the investigations under the Cotton Genetics Research Scheme is given below :—

Genetics of lintless genes.—Five genes responsible for lintlessness in Asiatic cottons have been identified and, while some of the inter-relationships among them have been worked out and published, work is in progress to complete the study and to determine the linkage relationships of the several lintless genes to other known genes. The data obtained, last year, from the study of a single F_2 family indicated that there was free assortment between 1027 lintless gene li_a and the anthocyanin gene R ; this was confirmed during the year from the study of a larger F_2 population, showing definitely that the lintless gene li_a is not linked with anthocyanin locus in Asiatic cottons. The independent segregation of this gene with lint colour gene K was also confirmed in a cross with narrow *Kokati* type. The study of the crosses with *arboresum* lintless types has indicated that wherever there is segregation of hairy linted and hairy lintless, there is a significant deficiency of the latter group which can only be explained as being due to the action of modifiers whereby some lintless plants appear as linted. The study of the problem is being continued in crosses between 1027 lintless and normal linted *arborcums*.

The differences in viability according to environment in the normal linted, short linted (heterozygous) and lintless (homozygous) types, reported last year, were tested during the year in two replicated experiments, one conducted at Indore and the other at Sri Ganganagar. The germination percentages obtained showed that while there was no difference in viability among the three types under Ganganagar conditions, there were significant differences at Indore, the normal linted being more viable than short linted, and short linted in turn being more viable than lintless. The difference in viability could thus account for the deficiency of lintless types sometimes observed.

The three types, normal linted, short linted and lintless were found to have different growth rates and the final heights attained by the plants were in the order, linted, short linted and lintless. The effect of the lintless gene is

to shorten the internodes, making the plant appear dwarfish. The same effect was seen on the leaf shape also where a genotypical narrow was made as broad. This was made clear in a family homozygous for broad leaf but segregating for lintlessness where there was a shortening of the lobe length in the homozygous lintless group.

Genetics of entire leaf mutant.—The entire leaf mutant from C. 7 was obtained from Coimbatore and crossed with different leaf shape allelomorphs. All the F_1 's exhibited complete dominance of the lacinated or narrow or broad character according to the parent used. The F_2 of only one cross, namely, broad (*Malvi 9*) \times Mutant has been studied so far and it gave 45 broad to 11 mutant, showing a single factor difference between the two, which confirms the results obtained at Coimbatore. The behaviour of the F_1 's in other crosses has indicated that this mutant belongs to the same leaf shape allelomorph series.

Genetics of seed fuzz.—In the crosses made between *Buri* naked (really tufted) with two fully fuzzy types, C. 920, M. U. 4, to study the inheritance of fuzziness, the F_1 and F_2 means and the F_3 behaviour gave an indication of the non-fuzzy nature being dominant.

Anthocyanin genetics.—Studies on several crosses with a type, *Tellapathi* (*G. arboreum* var. *neglectum* forma *indica*) obtained from Coimbatore have shown it to be a new member of the anthocyanin multiple allelomorphic series. It is designated R_2^{GS} and is characterised by the absence of a leaf spot and pigmentation in stamen filaments. R_2^{GS} is complementary with R_2^{OS} for the production of pigment in stamen filaments and leaf spot.

X-ray work.—The significant increase in the ginning percentage as a result of X-raying seeds of M.U. 4 and Upland strain, observed last year, was again manifest during the year. The results of the past three years have shown the behaviour of the treated seed, more particularly of that treated for 20 minutes to be consistent in respect of high ginning percentage. In the two previous years, no difference was observed in any other character in M. U. 4 as due to X-raying; during the year, however, in X_3 generation, there were significant differences in halo-length in X-rayed material. The difference between the two treatments, 10 minutes and 20 minutes, is significant and both treatments are significantly higher than the control. The test will be continued. E.B. 31 and M.U. 4 maintained their differences over control in node number.

Wilt work.—As pointed out previously, breeding for wilt resistance is carried on in three directions: (1) the replicated progeny rows, (2) non-replicated progeny rows in wilt land and testing the small bulks in replicated trial later, and (3) Swalof method of mass selection.

The breeding material consisted of six crosses (F_2^s), *Malvi 9* and *Malvi 9-20* crosses with each of the three resistant strains, *Jarila*, V. 434 and V. 438. The experiment was in duplicate, one in the wilt land and the other in the wilt-free land. In so far as wilt-incidence is concerned, there was no difference in the three sets of crosses, the mortality per cent being nearly the same in all. In the agricultural characters, however, *Malvi* x *Jarila* cross was better than others in yield, ginning percentage and halo length. It is now proposed to confine further selection work to this cross (F_2 stage). The study of the genetics of wilt resistance has shown that while there is a definite indication of resistance being dominant, nothing definite can be said at this stage about the number of factors involved.

Heterosis.—The *arboreum* strains, *Malvi*, *Bani* and C. 520, on which considerable work has been done with regard to quantitative inheritance, were utilised for determining the physiological basis underlying the manifestation of hybrid vigour. The three parents and their reciprocal F_1 s were grown during the year in a randomised and replicated experiment and the following observations were taken:—Plant height every 15 days, leaf area, dry weight of leaves and stems separately and dry weight of reproductive parts on random duplicate plants taken from each plot at intervals of 20 days. A rough examination of the data so far available showed that it was the increased meristematic capital with which the hybrids started which accounted for the manifestation of vigour. This was more than apparent in the cross, *Malvi* x C. 520, where due to greater parental differences in seed weight and meristematic tissues, the differences between the reciprocal F_1 were very striking.

Physiology.—The study of the competition effect between the Upland and *desi* cottons in a mixed crop was continued during the year. The trial consisted of two parts, (1) in which *Malvi 9* was grown mixed with three cottons, another *Malvi* strain, *Verum 434* and an Upland strain, and (2) where *Malvi 9* was grown mixed with 4 selected strains of Upland cottons. The first part which had run on for three years was closed. The only result that did not tally with the results of the two previous years was the behaviour of the mixture of *Malvi 9* and *Verum 434*. In the two previous seasons the spinning

value of this mixture was distinctly better than would be expected from the average value of the two components; in the year under report, however, the mixture gave a lower value than either of the components in fibre length and spinning value and a higher value than either of the components in fibre weight.

To test whether the treatment of seeds with hormones would result in better germination, better stand and higher productivity, a preliminary experiment was carried out during the year with proprietary products—Seradix A and Hartomone A, both of which are well known to stimulate root production. There were no significant differences in germination in the three seed treatments, viz., two hormones and water soaking, all of them giving a significantly higher germination than dry seed. The apparent response seen in the seed treatments was mainly due to the water used as the vehicle for applying the hormones. The general results thus do not appear to support the various claims put forward in favour of the proprietary preparations.

2. RESEARCH ON COTTON TECHNOLOGY.

Research on cotton technology and the testing of cotton fibres, yarns and cloth are carried on at the Committee's Technological Laboratory. A brief summary of the work done during the year is given below; full details are given in the Annual Report of the Laboratory which is now issued as a separate publication.

The total number of samples tested at the Laboratory during the period under review was 1,800 against 768 last year. The samples tested are dealt with in spinning, fibre test, yarn test and cloth test reports, which are issued on these samples. The number of such reports issued during the year was 1,046, which is nearly four times the number issued in the previous year. Amongst the tests made on samples received from Agricultural officers were *Jarila* cotton, which is now spreading rapidly in Khandesh; AGMARK samples of 1027 A.L.F. from Baroda and the adjoining British territories; medium and long staple cottons which are being tried in Bengal; and *Gaorani 6* which is now cultivated over a fairly large area in Hyderabad State.

At the request of the Indian Stores Department, facilities were provided by the Committee for the testing of Development samples and samples submitted against tenders at the Laboratory. A number of such samples were tested during the year and reports issued on them. Samples received in the

Testing House from the cotton mills and firms covered a very wide range, including fabrics of all kinds, single and ply yarns, sewing thread, parachute cloth, airmen's webbing, service dressings, absorbent cotton, etc. Tests covering a very wide range were carried out on these samples, including such tests as determination of ash content, wax content, wettability, hydrogen-ion concentration, water-proofing, etc. Several of the mills referred their specific difficulties such as, tendering of cloth, appearance of stains, presence of holes in the cloth, etc., which were investigated. The causes of the defects were found and reports issued to the mills together with suggestions for the prevention of the defects in question.

A number of technological investigations were also under progress during the year; these included the pre-cleaning and ginning of Indian seed cottons on different machines and with different settings and speeds, the effect of different treatments in the blow-room, effect of storage under Bombay conditions on the quality of Indian cottons, the influence of swollen hair diameter on the spinning quality of cottons, fibre properties in relation to seed characters, efficiency of kier boil and bleach treatments, etc.

Work on Indian linters was continued and the samples of linters for the past two seasons were analysed both by mechanical treatment and chemical process and the relationships between the results of the two treatments were worked out. Certain tests were also carried out on coir yarns at the instance of the Agricultural Marketing Advisor, the object being to see whether, on the basis of the results of such tests, any standards can be laid down for coir.

3. COTTON RESEARCH IN PROVINCES AND STATES.

(i) BOMBAY.

(a) **Broach Cotton Breeding Scheme.**—The Cotton Breeding Scheme at Broach has been in operation since April 1932. The original object of this scheme was to obtain, by selection or hybridization, suitable types of cotton possessing wilt-resistant, high yielding, high ginning and superior spinning qualities, to replace the local mixture, a large proportion of which consisted of *Goghari*, a short staple, high ginning (40%) variety. In view, however, of the Committee's policy to replace, wherever possible, short staple with medium and long staple cottons, attention is now being concentrated on wilt resistance, high yield and fibre length. The breeding of wilt-resistant types originally formed part of the Broach and Jalgaon Cotton Breeding Schemes but, as it was felt that the testing of cotton strains should be done under the

optimum conditions of wilt infection, and, as experience showed that these conditions, especially soil temperature in pots, were difficult to maintain at Broach and Jalgaon, the work was transferred to Poona in June 1935. In August, 1936 the wilt part of the two schemes was extended and it was decided that it should be treated as a separate scheme from the 1st April, 1937.

During the year under review, three of the best plants from each of the segregates-7-29 of [(B.D. 8 × G.A. 26) × B.D. 8] F₇ and 3-1 of [B.D. 8 × (B.D. 8 × S. 12-1)] F₅—were tested against I.A.L.B. and B.D.8, in wilt-sick and wilt-free plots; the segregates showed neither mortality nor partial wilting on wilt-sick soil, indicating thereby that they were as resistant as the resistant parent B.D. 8. The lint yield of both the segregates was significantly higher than that of B.D. 8, in both wilt-sick and wilt-free soils.

Of the seven best segregates, viz., 76-1, 76-12, 1-2, 1-6, 5-18, 7-29, and 3-1, tested against B.D. 8 and Broach Local as checks, on wilt-free soil, segregate 5-18 alone was found to be equal to the local in respect of yield of seed cotton and lint; the remaining segregates and B.D.8 were significantly inferior.

Village trials in the Broach District were conducted at three representative centres of the black soil area, viz., at Nabipur, Kelod and Kervada and at one centre in the *Gorat* soil area, viz., at Kamrad. Segregates 76-1, 1-2, 1-6 and B. D. 8 and Broach local were used for these trials and the results showed that at all the three black soil centres, the local yielded significantly more than the segregates and B. D. 8; segregate 1-6 was significantly superior to B. D. 8 at Nabipur, and 76-1 significantly inferior to it at Kervada. The results obtained at the *Gorat* soil centre were not conclusive. The low yield of the segregates and B. D. 8 was probably due to the exceptionally abnormal season. The tests carried out on the farm from 1937-38 to 1940-41 with segregates 76-1, 76-12, 1-2, 1-6 and 5-18, using B. D.8 and local as checks revealed that in respect of lint yield, segregate 1-6 was better than the local, while 5-18 was on a par with it. The remaining segregates, though somewhat low in yield, were definitely superior to B. D. 8. None of the segregates was inferior to the local in respect of ginning percentage, while segregates 1-6 and 5-18 were superior to it.

A nucleus of pure seed of B. D. 8 strain, which is being distributed in the district since 1935-36, was maintained. In addition, segregates 76-1, 1-2, and 1-6 were multiplied to procure sufficient seed for village trials and for multiplication in the district.

Under the wilt breeding part of this scheme, the object is to evolve a cent per cent wilt-resistant type from the material available at Broach. During the season under report, B. D.8-B₄ and N.S. 12-B₅, N. S. 12-H₁ and N. S.12-H₃, isolates from B.D. 8 and N. S. 12, respectively, are reported to have been found completely free from wilt. It is reported that the material of the composition of (B. D. 8 × G. A. 26)F₂ and (B. D. 8 × G. A. 26)F₃ has reached homozygosity for 100 per cent wilt-resistance. The study of the genetics of wilt-resistance has shown that wilt-resistance is due to a single gene.

(b) Jalgaon Cotton Breeding Scheme.—This scheme has been in operation since April 1932. Its original object was to obtain, by selection or hybridisation, suitable wilt-resistant types with heavy yielding, high ginning and good spinning qualities, to replace the local mixture of N.R. and *Banilla* cottons in Khandesh. Wilt breeding work was originally included in the Broach and Jalgaon Cotton Breeding Schemes, but, in August 1936, it was decided that the wilt work should be treated as a separate scheme from the 1st April, 1937.

During the year under report, the 23 plant selections of Dokras cotton, which had been found to be superior to *Jarila* in ginning percentage and either equal or superior to it in staple length in the previous year, were tried in five replications against *Jarila* as the control; seven selections, none of which was inferior to *Jarila* in respect of yield, ginning outturn or staple length, have been found worthy of further trial. With the object of evolving desirable *Jarila* types, combining the high ginning percentage of N. R.5 and cent per cent wilt resistance of the New Million Dollar, the progeny of the following crosses were examined and selections made :—

1. [(*Jarila* × N. R.5) × N. M. D.] F₂
2. (*Jarila* × N. R.5) F₃
3. [(*Jarila* × N. M. D.) × *Jarila*] F₁

Of the 124 lines of the first cross that were under observation, 17 were found to be practically as resistant to wilt as *Jarila* and superior to it in respect of ginning outturn. Five desirable plants from each of these have been selected for further study. In addition, 40 plants from the best lines of the second cross and 27 plants from the third cross have been selected for testing in the ensuing season.

89 Dokras cultures were tested for wilt resistance in artificially infected plots and those which showed desirable combinations of characters were selected.

Village trials were conducted at 11 centres for testing the yielding capacity of *Jarila*; in four centres the yield of *Jarila* was lower, in another four it was as good as that of the local, and in the remaining three centres it was better than the local. The ginning percentage of *Jarila* during the year ranged from 33 to 36.7.

Jarila was sold by auction at various centres in Khandesh at a premium of Rs. 27 to Rs. 47 over Broach.

Work under the wilt breeding section of this scheme conducted at Poona consisted of testing a few of the best plants of New Million Dollar which is reported to be homozygous for 100% resistance, under optimum conditions of infection. Results of the study of the genetics of wilt resistance showed that resistance in *G. arboreum* is controlled by three complementary factors, wilt resistance in F_1 being incompletely dominant.

(c) Scheme for breeding wilt-resistant cottons in Surat area.—This scheme was sanctioned by the Committee in August 1936 and commenced work in April 1937. The object of the scheme is to obtain a strain of cotton completely resistant to wilt and suited to the natural conditions obtaining in the Surat tract. This is sought to be achieved either by selection in 1027 A. L. F. or by crossing this cotton with B. D. 8 or other wilt resistant strains.

The testing work during the year was carried out in the wilt-infected plot at Shera. F_2 populations of the following four crosses were tested for wilt-resistance:—

(1) $(8-1 \times K. F.) F_2$

(2) $(8-1 \times B. D. 8) F_2$

(3) $[8-1 \times \{ (B. D. 8 \times G. A. 26) \times B. D. 8 \} F_{C-1-6}] F_2$

(4) $[1027 A. L. F. \times \{ (B. D. 8 \times G. A. 26) \times B. D. 8 \} F_{C-1-6}] F_2$

As selections from 1027 A. L. F. suffered from wilt to the same extent as the control, it is now proposed to discontinue further work on them. Segregate 8-1 showed no mortality, though there was some evidence of partial

wilting ; it will be further tested in wilt-sick soil at Shera and in pot cultures at Poona.

(d) Scheme for improvement of Wagad cotton at Viramgam and Jagudan.—While examining the possibility of growing medium and long staple cottons in the short staple areas of India, the Committee, in August 1935, decided that, in view of the absence of any serious attempt to improve the cotton of the large *Dholleras* tract, a comparative study of Indian and Iranian *herbaceum* cottons should be undertaken, with the object of finding out one or more suitable types for the tract. A special officer was deputed to Iran to collect *herbaceum* types of cotton grown there and, in August 1936, a five-year scheme was sanctioned for the improvement of *Wagad* and *Mathio* cottons, the work on *Wagad* cottons being centred at Viramgam and that on *Mathio* at Amreli. Simultaneously, a small immune area is maintained at Jagudan under irrigation to safeguard the work at Viramgam. The objects are the improvement of *Wagad* cottons for (a) quality and yield and (b) earliness in order to escape frost, and the replacement, if possible, of the inferior *Mathio* cotton of Kathiawar by early *herbaceum*. These are sought to be achieved by (a) selection in *Wagad* cotton, (b) hybridisation with Surti-Broach quality cottons like 1027 A. L. F. and B. D. 8 and (c) hybridisation with Iranian *herbaceums* known to be early and of better quality.

The season during the year was very dry, the rainfall being only 10.96" against the average of 22.7". The standard strain, *Wagad* 8, though superior to the local in yield and ginning percentage was found to be lacking in the desired staple quality. Eleven *Wagad* selections and the promising segregate, H.S.B. 1, were tested in progeny rows with *Wagad* 8 and local *Wagad* as controls. Five selections and segregate H.S.B. 1 were found to be splitting with regard to ginning percentage but, as further improvement in them appeared possible, they have been retained. Three old varieties—local, *Wagad* 8 and Segregate 4-1, two new ones—H.S.B. 1 and N. 89—and three promising types—115, 126 and S. 89—were compared with *Wagad* 8 in random replications ; S. 89 was significantly inferior to all, indicating that it does not do well under the dry conditions of Viramgam. It is, however, reported to be suitable for the heavy rainfall tracts of Dholka.

Selections from crosses, back crosses and composite crosses of *Wagad* 8 with Surti-Broach quality cottons were continued and in all 174 plants were retained for further testing. One back cross, B.C.W. 8×22-3-1 F₂, was found to be very promising.

Work on crosses with Russian, Persian, East Iranian and early *herbaceums* was continued with a view to evolving desirable types combining early maturity with fine, long staple.

In a replicated trial of early, promising Viramgam selections (S. 115, 126 and 314) with *Wagad* 8, local *Wagad* and segregate 4-1, at Jagudan, S. 115 and 126 gave promising results in respect of yield and early maturity; it is thought that S. 115 may prove to be a better substitute for *Wagad* 8. In another trial of five open-boll types, with *Kanvi* local and *Chokadia* as controls, Segregate 7-1 gave better results in respect of yield, ginning outturn and spinning performance, but it suffered from the defect of late maturity, defective boll-opening and early boll-shedding. *Chokadia*, though early, high yielding and a good ginner, was very poor in respect of spinning capacity. Work to evolve a new type to replace *Chokadia* is in progress at Viramgam.

(e) Scheme for inclusion of Northern and Western cottons in programme of work of Dry Farming Scheme at Bijapur.—This scheme was sanctioned by the Committee in August 1936, in pursuance of the recommendations of the Agricultural Research Sub-Committee, which, while considering the subject of the possibility of growing long and medium staple cottons in the short staple cotton areas of India, expressed the view that in short staple cotton areas like the Bijapur district in the Bombay Province and Raichur and Gulbarga districts in the Hyderabad State, where the rainfall is limited and precarious, a solution of the problem confronting the successful growing of medium and long staple cottons might be found in devising suitable dry farming methods. The scheme came into operation in June 1937.

During the year under review, the work under the scheme consisted of two parts. In the first part, six replicated and randomised experiments were carried out. One experiment was intended to test the comparative performance of the four strains, N. 14, H. 1, *Jayawant* and local *Kumpla*, and the effect on them of farmyard manure and castor cake; the object of the remaining five was to assess the value of different operations and treatments included in the Bombay Dry Farming method, *viz.*, tillage, bunding and mulching, spacing, rotation, fallowing and green manuring. In the second part *Northern* and *Western* cottons were tested on a field scale under the Bombay Dry Farming method for comparison with the local cultivators' methods. Owing to severe shortage of soil moisture and general drought conditions,

however, the cotton crop failed entirely, and no yields were obtained in any of the experiments.

As the scheme had been in operation for four years, and no definite results had been obtained, it was decided not to extend it on the completion of its sanctioned term in May 1941.

(f) Scheme for interspecific hybridisation in cottons at Surat.—This scheme was sanctioned by the Committee in January 1938, for a period of five years, with the object of obtaining, if possible, fully fertile hybrids between Asiatic and American cottons, combining the useful agronomic characters of both, particularly the good staple length of the American and hardiness and adaptability to Indian climate of the Asiatics. Work on crossing Asiatic and American cottons, begun at Surat in 1932, had already yielded 23 hybrids in which the American parents used were mostly the acclimatised Upland types from different parts of India, while the Asiatic parents were forms of *G. herbaceum* and *G. arboreum*. The hybrids produced from these were, however, sterile and efforts to induce fertility in them were successful only when they were back-crossed to American types.

As a result of the large scale crossing work done under the scheme, 40 first generation hybrids have been produced, which are all self-sterile. It has been possible, however, to induce fertility by back-crossing them with New World cottons. Out of 56 back-cross plants, 47 have been found to be more or less fertile, providing varied and useful material for further selection. From the F_2 , F_3 and F_4 generations of these back-crosses, 91 plants with a ginning percentage, ranging from 25.6 to 41.2 and staple length from 22.8 to 33.8 mms. have been selected for further study. Some of these show better combinations than the American parents. B.C. No. 22, obtained by back-crossing (Co. 2 \times Red *arboreum*) F_1 to Co. 2, has been found to be highly fertile and gave promising material for selection. The fact that a few of the first back-crosses are highly fertile is very encouraging. The American parents so far used in crosses have been mediocre ones, but a few long staple types have now been obtained from America and are being used in further work.

During the year under review, the F_1 hybrids (New World \times Asiatic), which were sterile, were back-crossed to higher chromosome parents, with the object of inducing fertility and 24 bolls having 37 seeds were obtained. Cuttings and grafts of sterile F_1 hybrids were treated with colchicine; out of

twenty three grafts thus treated, one showed characteristic effects and set a stray boll. The progeny of various fertile tetraploids and hexaploids produced by colchicine treatment was raised on a large scale but it proved to be very slow growing and late maturing. The progeny of two hexaploids was observed to be free from jassid and leaf-blight attack. The number of seeds per boll and the ovule : seed ratio were very low, indicating that the population in general was still chromosomally unbalanced.

Cytological examination of the first generation hybrids between American and Asiatic cottons showed that, with the exception of 3, all had 39 (26+13) chromosomes and that sterility was due to a set of 13 chromosomes remaining unpaired, which resulted in the formation of unbalanced germ cells. 14 fertile first back-crosses had 52 chromosomes and the detailed study of the chromosome pairing in them explains in general the variation in fertility of the hybrids.

(ii) SIND.

(a) Scheme for Cotton Jassid Investigation.—In Sind, jassid attack is most prevalent in the south-east Tharparkar district where it is proposed to establish a compact block of long staple cotton. One of the harmful effects of this pest is improper development of the seed, so that, in certain seasons, good seed is not available for sowing purposes, and this gives a setback to the extension of improved varieties. Accordingly, in August 1937, the Committee sanctioned the above scheme, for a period of three years and six months, with the object of studying the habits of jassids, their alternative hosts and the manner in which certain varieties of cottons resist jassid attack. In January 1941, the scheme was extended up to 18th April, 1945. The progress made during the period under review is described below :—

The incidence of jassid attack, during the year was greater than in the previous year, though the damage caused was mild throughout the province. The observations on the relative infestation of jassids on different varieties of cotton, sown on the same date, showed that S. L. D-1 and M-4 had the lowest jassid population, M.2 came next, whilst Sind *Sudhar*, 4F-98 and T-23 had the highest. In the seasonal sowing carried out with M-4 and Sind *Sudhar*, it was found that the intensity of jassid attack increased with the delay in the date of sowing. Early sowing from mid-March to mid-April is, therefore, recommended.

Jassid nymphs had no difficulty in developing on any cotton variety—susceptible or resistant, hairy or non-hairy. The examination of varieties in search of plant characters determining resistance to the pest indicated that hairiness of cotton leaves was not a reliable character for judging jassid resistance. Besides cotton, the pest is reported to be present on several other crops, such as *bhindi*, brinjal, potato, hollyhock, *pattir* and *phalsa*, and this precludes the observance of a close period as a measure of control. Applications of larger doses of artificial manures had marked effect in reducing the jassid population.

The occurrence of the pest was more marked when the crop was sown with 6' spacing, than in 12', 18' and 24' spacings. In another experiment, in which Sind *Sudhar* was treated with different doses of potash and phosphorus, it was found that the jassid population decreased considerably with the application of higher doses of the manures, the plots with no manure showing the largest number of jassids.

(b) Scheme for Investigation into Black-headed Cricket in Sind.—This scheme was sanctioned by the Committee in January 1938, for a period of three years, with the object of establishing the identity of the pest and studying its life history, seasonal behaviour and the extent of the damage caused by it. Before the opening of the Lloyd Barrage, the Black-headed Cricket had been known as an occasional pest of Sorghum and cotton in Upper Sind and some parts of the Punjab. With the introduction of cotton cultivation on the Right Bank of the Indus, however, this insect has become a serious pest of cotton in the seedling stage in Khirtar and Johi tracts in Sind and in some parts of Baluchistan. The pest appears in the cotton fields towards the end of April and disappears in June. The period of its activity synchronises with the sowing time of cottons and causes almost wholesale destruction of the crop. The pest appears to belong to the same species as met with in Baluchistan, viz., *Gryllulus domesticus*. Since April 1941, the scheme has been merged in the scheme for co-ordination of research on Black-headed Cricket in Sind and Baluchistan.

It is reported that the pest responsible for the damage was re-identified as *Gryllulus domesticus*, Linn. Two other species of crickets, one of which has been identified as *Liogryllus bimaculatus*, have been observed to cause slight damage to the cotton crop. Fifteen specimens of the pest were reared in the laboratory from the egg to the adult stage for the purpose of studying

its life cycle. The females lay a large number of eggs near one another in either stiff soil that cracks or in lighter soil; sandy loam and sandy soils are not favoured for egg-laying. The total duration of the nymphal stage in the laboratory varies from 32 to 61 days. It was noticed that the insect passed through 3 generations during the year, against 4 in the previous year and that it over-wintered in the nymphal and adult stages.

During the course of the field survey, it was observed that in Khirtar tract the pest was entirely in the nymphal stage towards the middle of April. These nymphs and the adults that emerged from them, being very active and voracious, were responsible for most of the damage done to the cotton crop. The insects bored a hole into the seed coat and ate away the kernel within. In the Dadu district where the pest appeared late and after the germination of the seed, the leaves were chopped off up to the 2nd leaf stage.

In view of the enormous damage caused by the pest in the Khirtar tract the undermentioned bait was used for its control but though effective, it was not economical, probably because the control work was undertaken on a small scale :—

Sodium fluosilicate	1 seer
Rice bran	20 seers
Molasses	1 seer

with enough water to make it crumbly.

The damage caused by the pest was ascertained from April to June or July, 1940, and it was found that the first sown crop suffered most, the damage varying from 25% to cent per cent.

(c) Scheme for production of long staple cottons in Sind.—Sind is the only Province in India which may be said to be suited for the production of long staple quality cottons of the Egyptian and Sea Island types. Ever since the opening of the Lloyd Barrage, the question of the establishment of a compact block of long staple cottons in Sind has engaged the attention of the Indian Central Cotton Committee. Although attempts in the introduction of long staple quality cottons in Sind, in the past, have not met with the success it was anticipated they would, the project, nevertheless, is considered to have possibilities which are well worth investigating. Accordingly, a five-year scheme for cotton breeding investigations for the production of long staple cottons has been launched. The scheme came into operation in April

1940. The experimental stations are situated at Mirpurkhas and Oderolal. The most important problem to be tackled is to see whether high quality cottons, preferably of the 289F types, but possessing a better staple than Sind *Sudhar*, can be produced. The aim is to evolve a cotton longer than 1-1/16" which would spin about 60 counts and yield not less than 6 maunds of seed cotton per acre. The more important items in the programme of work are:—(1) Production of hybrids, using the back-cross technique, between cottons of 289F type and long staple cottons. (2) Testing of various selections from 289F. (Experience has shown that conditions for growth of cottons of 289F type are more favourable in Sind than in the Punjab). (3) Importation of fresh material from a wide range of places, such as, Egypt, Sudan, South Africa, U. S. A. and Brazil, etc., for acclimatisation, selection and for providing material for hybridisation purposes. (4) Working out a system of cultivation best suited for long staple cottons.

Two groups of cotton, viz., *hirsutum* and *barbadense*, which consisted mostly of types imported from abroad, were tested during the year under review and observations recorded. Reciprocal crosses were made between each of the long staple *hirsutum* types and Sind *Sudhar*, the established commercial variety of long staple cotton in Sind. Crosses were also made with M. 4, a desirable new Sind-American strain under trial. All available good material has been sown as F₁ in the current season along with their respective parents.

In the experiment 'Ridger versus flatsowing,' Sind *Sudhar* and Sea Island 2-4 were sown on ridges and flat beds in randomised replicated plots, and yields of seed cotton and final stand were compared. Sind *Sudhar* is reported to have given significantly better yield than Sea Island. Ridging made no difference in yield though stand on ridges was slightly better than on flat beds.

(d) Scheme for bollworm investigation and clean-up campaign in Sind.—This scheme was sanctioned by the Committee in January 1940, for a period of 3½ years, and it came into operation on the 1st September, 1940. The work proposed to be carried out under the scheme during the first seven months was (a) to survey the host plants during the off-season of cotton and (b) to test the efficacy of the implements evolved elsewhere. During the remaining period, it is proposed to carry out a clean-up campaign and to study its effect on the succeeding year's crop. The investigations are confined to the Tharparkar district.

During the year under review, a study of the incidence of the pest in 17 different localities, selected at random all over the Tharparkar district, was undertaken. The progress of the bollworm attack during the period—September to October—was noted by examining samples of buds, bolls and flowers every fortnight. The results showed that the Pink bollworm was only a minor pest of cotton in the Tharparkar district. As regards the Spotted bollworm, it was found that, in areas growing more rice than cotton, the attack was very high, the range being 25-61% and the average 35%; in areas growing partly rice and partly cotton, the attack ranged from 9-28%, the average being 15-9% and in areas growing mostly cotton, the attack was comparatively mild, ranging between 2-20%, the average being 10-5%. The intensity of infestation was at its maximum from mid-September to mid-October. It is suspected from the data that the cotton in the rice area serves as a breeding ground for the bollworms in Sind.

The life-history of the Spotted bollworm was studied under laboratory conditions at Mirpurkhas and the duration of the life-cycle was observed to vary with the season, being 18-28 days in summer and 37-60 days in winter. Observations on the relative incidence of the two species of the Spotted bollworms—*Earias insulana* and *Earias fabia*—showed that the former is predominant. The larval parasites met with in the area were *Rhogas testaceous*, *Actia aegyptia* and *Elasmus Sp.*, but they did not appear to control the pest to any appreciable extent, as they became active towards the close of the cotton season when the pest had already established itself. *Microbracon Lefroyi*, which is the most effective larval parasite of the bollworms is reported to be altogether absent. Trials for the introduction of this parasite in this tract were approved by the Committee and are now under way. Besides cotton, the pest is reported to infest *Abutilon indicum* (*Patitir*), *Hibiscus esculentus* (*Bhindi*), and *Althea rosea* (Hollyhock), which enable it to carry over from one season to another. Cotton stalks allowed to remain in the field after harvest are reported to serve as the major source of infestation for the succeeding cotton crop.

Preliminary investigations on the efficacy of implements for removing the cotton stalks showed that the '*Kudali*' was more suitable for the purpose than the plant puller. This implement was accordingly employed for removing cotton stalks and for destroying '*Patitir*' (*Abutilon indicum*) over an area of about 3,000 acres. For the campaign in 1941-42, a compact area of

570 sq. miles, mostly in the Samaro and Umerkote *talukas* of Tharparkar District, has been selected. Propaganda work in this connection has already been started.

(iii) PUNJAB.

(a) Punjab Botanical Scheme.—This is one of the earliest schemes of the Committee. Sanctioned in 1923, for a period of five years, it came into operation in August 1925, and has been extended from time to time, the last extension, which will expire on the 28th February, 1945, being approved by the Committee at its meeting held in January 1940. Until 31st March, 1936, the entire cost of the scheme was borne by the Committee, but since then, the expenditure is shared on a 50:50 basis between the Committee and the Provincial Government. The original object of the scheme was to investigate the causes of the periodic failures of American cotton in the Canal Colonies of the Punjab where a large area is annually grown under such cottons, and to obtain suitable types of American and *desi* cottons. In view, however, of the immediate economic importance of improved types of cotton, work was concentrated on breeding, and a separate physiological scheme was sanctioned for investigating the problem of periodic failures of American cotton. The Botanical scheme has thus been concerned mainly with the improvement of both *desi* and American cottons. As more than half the cotton area in the Punjab lies in the Canal Colonies, attention was first directed to the improvement of the cottons of that area. The South-Western tract of the Province, comprising the arid districts of Multan, Muzaffargarh and Dera Ghazi Khan, were given attention next and a sub-station for this purpose was opened at Multan in 1935. The first improved variety of American cotton to be given out for general distribution was 289F/43 in 1935. The area under it during 1940-41 was estimated to be some 1,21,000 acres. Other improved strains are L.S.S. and 289F/K. 25, which occupied an area of 2,09,000 and 1,86,000 acres, respectively. Amongst the *desi*, the first cotton to be evolved was 16 *Mollisoni* in 1929. This was replaced in 1930 by 15 *Mollisoni*, which was, in 1934, replaced by 39 *Mollisoni*. The latter is now the standard *desi* cotton of the Canal Colonies and the area under it during 1940-41 was estimated to be 4,59,000 acres. 39 *Mollisoni* is said to have gained so much popularity that in most parts in the Canal Colonies, it has driven other types of *desi* cotton out of cultivation. 119 *Sanguineum* and 12 *Sanguineum* are two other *desi* strains evolved under the scheme;

the former was the first fruit of research at the Multan Sub-Station. *119 Sanguineum* matures so early that wheat or gram can be sown after the pickings are over. Being a drought resistant, high yielding and high ginning cotton, it has become increasingly popular in the South-Western tract. *12 Sanguineum*, on the other hand, is gaining popularity in the rainfed areas of North Punjab. During the year under review, these three cottons, viz., *39 Mollisoni*, *119 Sanguineum* and *12 Sanguineum*, occupied about 42 % of the total area under *desi* cottons in the Punjab.

Reselection in 289F/43 and L. S. S. strains was carried out with the object of improving the ginning percentage of the former and isolating an early maturing type from the latter. Seven hundred plants of 289F/43 were selected from cultivators' fields in 1939 and 46 plants, combining the desirable qualities, were sown during the year as single plant progenies. Of these, plants of 24 families conformed to 289F/43 type in plant habit and earliness. On the basis of laboratory data, however, only 5 families appeared promising; family 30/40 was the most promising with an average halo length of 28.8 mm. and 33% ginning outturn.

The varietal test with American strains at Risalewala showed that the strains 148F, 124F, 125F, 147F, L. S. S. and 146F were significantly better in respect of yield than 289F/43, whilst, in the test with *desi* types, none was found to be statistically superior to *39 Mollisoni*.

As in previous years, American and *desi* varieties were tested in a large number of places under the cultivators' conditions; L. S. S. gave good yield at Sargodha and Jhang and the new strain 124F showed good performance at Lyallpur, Hansi, Iqbalnagar, Military Farms, Okara, and Kot Ganeshdas. 124F has now been tested on field-scale for 3 years, and, in most of these tests, it has outyielded every other American variety. In addition to being a high yielder, it possesses excellent fibre properties and gives a ginning outturn of about 33%.

Of the *desi* strains tried, *39 Mollisoni* remained unbeaten in respect of yield at Lyallpur, Okara and Khanewal but was excelled by *138 Mollisoni* at Ferozepur, Montgomery and Gurgaon. The performance of Jubilee was noteworthy at several places. It would appear that there are certain areas in the Province where American cotton does not flourish and *desi* cotton has to be grown. It is felt that if on a part of this area Jubilee could be substituted in place of *desi*, it will be in the interest of the growers.

119 Sanguineum was tested for yield at 323 centres and was found to yield, on an average, 1.3 mds. more than the local *desi* cotton; it appears to suffer less from the attack of spotted bollworm, and possesses a better ginning outturn than *39 Mollisoni*. The financial gain to the cultivator by growing *119 Sanguineum*, instead of the ordinary *desi* cotton, is estimated at Rs. 10-13-0 per acre.

Varietal trials with seven types—*119 Sanguineum*, *39 Mollisoni*, 289F/43, 289F/K.25, 124F, L. S. S. and 4F—conducted under conditions of tenant cultivation, revealed the superiority of 124F over other American strains and of *119 Sanguineum* over *39 Mollisoni*.

(b) Scheme for improvement of Punjab-American 289F/K25 cotton.—This scheme was sanctioned in January 1938, for a period of five years and commenced work from the 9th July 1938. The object of the scheme is the improvement of 289F/K.25 cotton which was evolved at the B. C. G. A. Farm some years ago. Though this strain is very popular in the Lower Bari Doab Canal Colony and the area under it has expanded very rapidly, it suffers from the defect of susceptibility to jassid attack. One of the aims of the present scheme, therefore, is to develop jassid-resistant strains from this cotton.

During the year under review, the crop at the B. C. G. A. Farm was very satisfactory and gave an average yield of 14 maunds 23 seers per acre. Owing to the prevalence of 'tirak' and heavy incidence of jassid infestation, conditions for selection of plants resistant to bad opening and jassids were very favourable. Out of a total of 121 single plant progenies of 289F/K.25, 89 were discarded after rigorous selection on the basis of jassid susceptibility and ginning outturn below 34%, and single plants from the remaining 32 resistant and high ginning families were retained for further trial. The chances of securing a strain of 289F/K.25 fairly resistant to jassids appear to be quite promising.

The hybrid material, grown during the year, consisted of (a) 25 families of F₃ of (289F/K.25, 289F/43) and (b) 14 families of the second generation of the first back-cross with 289F/K.25. It was observed that hairiness was generally associated with jassid resistance. The ginning outturn of the F₃ plants of the cross was low compared with that of the plants of the 2nd generation of the back-cross. The most promising plants have been selected for further study.

As in the previous year, mass selection was carried out in the general crop on the B. C. G. A. farm, with a view to purifying it. Comparison of the economic characters of the selections thus made with those of the general crop showed that mass selection has improved the purity and increased the ginning outturn of the crop. No change was, however, observed in the halo length.

In the varietal test of the American strains evolved at Lyallpur and Multan conducted at Khanewal, 124F showed itself to be outstanding in respect of yield and ginning outturn. The yield of 289F/K.25 was comparatively poor, though, in other commercial characters, it was more or less on a par with 124F.

(c) Physiological Scheme.—Partial failures of the American cotton crop in the Punjab occurred in the years 1919 to 1921, 1926 to 1928, 1931 and 1932. The external symptoms of the cotton plants during these failures were early reddening and shedding of the leaves, premature opening of the bolls with immature seeds and low quality lint and, in extreme cases, the dwarfing of the plants. To account for these failures, various views were advanced, such as, the heat stroke theory (Milne, 1924), attack of White Fly (Roberts, 1929) and unfavourable combination of climatic and biotic factors (Trought, 1931). As, however, these theories could not be supported by sufficient data, it was thought that the failures might be due to malnutrition of the plant and a physiological scheme was accordingly started by the Committee in March 1935, to study the physiology of the cotton plant with a view to determining if possible, the nature of the nutritional disorder, its causes and the measures necessary to combat it. The scheme started work in 1935. In March 1937, the Empire Cotton Growing Corporation loaned the services of Dr. Mason to the Committee to inspect and report on the scheme and, on his recommendation, a soil survey on a large scale was undertaken to connect up soil conditions with cotton failure. The scheme is due to terminate in March 1943.

The work done so far has indicated that two sets of soil conditions are associated with the development of '*tiral*,' viz., (i) soils with saline sub-soil and (ii) soils with nitrogen deficiency. These conditions may exist separately in separate fields or together, the intensity varying from field to field. Plants growing on soils of the first type appear normal until July, but later exhibit symptoms of drought. The recovery from wilting after each irrigation is of short duration and by the beginning of September, the leaves begin to shed ;

there is also considerable shedding of flowers. The few bolls that are formed, crack and are found to contain immature seeds. In soils of the second type, the growth of the plant is luxuriant when the soil is light sandy loam. Starvation symptoms appear at the bolling stage when the leaves turn yellow and red and are shed. The size of the new leaves is comparatively reduced; the number of bolls produced per plant is normal but they crack and contain immature seeds. In very heavy soils, containing alkali salts in the sub-soil, the growth, though normal for a few weeks, is later suppressed. The plants remain stunted and possess dark green leaves which show symptoms of drought. Premature defoliation of leaves and later '*tirak*' occur. '*Tirak*' is found to appear in its most serious form on sandy soils with alkali salts in the subsoil; such soils are also deficient in nitrogen. The bolls are small in size and open badly. Tannins are produced in leaves with low nitrogen content; their presence in the leaves, which can now be easily detected by a simple method specially devised and known as the 'tannin test' can be regarded as an index of nitrogen starvation. If nitrogen in the form of sulphate of ammonia is applied to a crop when the test for tannins is given by the leaves, it is found to recover within eight days after application and the appearance of '*tirak*' can be prevented. '*Tirak*' on the first type of soil with the alkali salts cannot be ameliorated by the application of manures, which only results in vigorous growth.

During the year under report, more than 300 soil samples from about 50 spots where normal and '*tirak*' plants were observed, were analysed to confirm the previous results. The samples were analysed for total soluble salts, soluble and exchangeable calcium and sodium and for pH. In many cases soluble sulphates, chlorides, bicarbonates and carbonates were also determined. Mechanical analyses were done wherever necessary. The result of these analyses confirmed the previous findings regarding the association of soil-conditions with '*tirak*'. The soils where '*tirak*' occurred contained higher amounts of soluble or exchangeable sodium, or both, than calcium in the sub-soil. In some '*tirak*' patches, the pH was higher than the normal. In some cases, there was an increase in clay content from above downwards, while no such increasing trend was observed in other '*tirak*' patches. '*Tirak*' patches with a saline subsoil either occurred on sandy loams or on light sandy soils; the degree of salinity varied from patch to patch and even within the same patch. Normal, non-saline lands were found to be intermingled with soils having salinity in the sub-soil, in the same field.

The physical and chemical properties of the light sandy soils where the crops suffered from nitrogen deficiency did not show any special features except that the base exchange capacity of the soil in some cases was very low, i.e., about 3 to 4 m.e. per 100 grams of soil. The tannin test carried out in the season again showed that soils with nitrogen deficiency are of common occurrence in the Punjab and are found mixed up with normal soils as well as with soils having saline sub-soils. The worst form of '*tirak*' occurs on light sandy soil with an alkaline reaction and it is greatly aggravated by hot weather at the fruiting stage.

The experiments on ameliorative measures for '*tirak*' conducted at Lyallpur in 1939-40 showed that, (1) late sowings greatly reduced '*tirak*' on both soil types referred to above, (2) heavy waterings at the fruiting stage decreased '*tirak*' on saline subsoils and (3) application of sulphate of ammonia remedied '*tirak*' on light sandy soils where the crop suffers from a deficiency of nitrogen. These results were tested during the season under report by laying out multiple factor experiments in different cotton growing tracts of the Punjab. Commonly cultivated American varieties and one *desi* variety were included in the tests. All combinations of 4 sowing dates (two in May and two in June), two levels of watering (normal and heavy) and two levels of nitrogen (0 and 33 lbs. N) were tried. It was found that, except on soils which are saline or alkaline within two feet from the surface, June sowing, in addition to its ameliorative effect on '*tirak*' can also give higher yields than May sowings, provided close spacing is adopted. Frequent waterings from mid-August to mid-October resulted in an increased mean yield of 5.5 mds. per acre. The response was not, however, so high on light sandy soils which are saline in the sub-soil. Applications of sulphate of ammonia gave substantial increases in yield on light sandy soils deficient in nitrogen but no increase was registered on sandy loams which are saline in sub-soil. Light sandy soils with saline sub-soil gave only a medium response to the application of nitrogen and extra-watering.

A study of the effects of salinity, temperature (September-October) and sowing time on development and spread of '*tirak*' under normal conditions of irrigation and rainfall showed that, (1) under given conditions of temperature and sowing time, the resistance to '*tirak*' declines as the salinity increases; (2) under given conditions of salinity and sowing time, the resistance to '*tirak*' declines as temperature in the month of September or October rises above the normal; (3) under given conditions of temperature and salinity, the resistance

to 'tirak' increases as the sowing time advances from May up to the end of June. There was also an indication that an unusually warm September produces more intense 'tirak' than an equally warm October. The weather conditions that would aggravate nitrogen deficiency in the soil are being investigated.

(d) **Root Rot Scheme.**—This scheme, which was sanctioned by the Committee in 1932, is concerned with the investigation of the cause and control of root rot in the Punjab, where, particularly in the canal irrigated areas, the annual damage done to cotton by this disease is estimated at several lakhs of rupees. Both *desi* and American varieties are equally affected by the disease which makes its appearance towards the end of June and continues up to the middle of September. The organisms responsible for the disease are *R. bataticola* and *R. solani*.

During the year under report, experiments were conducted mainly at Lyallpur and Khanewal with *desi* and American cottons, to ascertain the effect of shifting the date of sowing on the incidence of root rot, the object being to evade the time of optimum activity of the causal fungi. The occurrence of the disease was found to be highest in May sown cottons and negligible in those sown in the first week of April or the end of June. Both *desi* and American cottons, when sown late and planted closely, gave significantly higher yields than the May sown cottons. The lower yields of the American varieties were due to bad opening of bolls.

The results of the experiments to test the effect of intercropping cotton with sorghum and *moth* (*Phaseolus aconitifolius*), as a measure of control against the disease, were in line with those of the previous years. In the case of sorghum, it was found that the extent of reduction of the disease varied with the period of retention of the sorghum plants in the field, whilst the removal of *moth* as early as the 1st of August reduced the mortality of cotton plants to an appreciable degree. In the mixed crop, the American cottons were observed to be significantly better in respect of yield than the control, both at Lyallpur and Khanewal. In the case of *desi* cottons, the results were not significant at Lyallpur. Sufficient data are, however, not available to explain the differences in the behaviour of *desi* and American cottons. It was observed at Lyallpur that cotton, when intercropped with cowpea and *guar*, tended to show a greater degree of resistance to the disease.

A varietal test, which included 64 foreign and local types, was tried on heavily infected soil. The varieties were sown in May so as to receive optimum infection and were replicated thrice. It was noted that all the types succumbed to the disease and showed a high rate of mortality. None of the progenies of the plants selected (117) last year showed any appreciable resistance to the disease.

(e) **Cotton Jassid Investigations in the Punjab.**—This scheme is concerned with the study of the Jassid insect in the Punjab, as regards its habits, alternative host plants and characters of the cotton plant which determine resistance to the pest.

The attack of Jassids, during the year under review, was appreciably higher than in the previous three years; it was very serious at Sargodha and Okara, mild at Lyallpur and Montgomery and negligible at Multan and Khanewal. Of the commercial varieties, 104F, 289F/K.25 and 124 F were found to be most susceptible, while 289F/43, L.S.S. and 186 F were most resistant. At Lyallpur, however, 4F was found to be the most resistant variety. Maximum infestation was recorded about the first half of September.

A complex experiment with 289F/43 and L.S.S. was conducted at Risalewala to test the effect of sowing-date, manuring and spacing on the incidence of the pest, but the results obtained were not significant.

The behaviour of Cambodia was again studied under artificial conditions of infestation, and it was noticed, at the end of the season, that the plants were slightly affected, but this was only temporary. In view of its high resistance, Cambodia was crossed in 1938 with 58F—a susceptible and high-yielding type—and the progenies of this cross are now under trial. The data collected do not indicate that the character of hairiness in the variety is positively correlated with resistance to Jassid.

The economic importance and seasonal distribution of the species of Jassids other than *E. devastans*, viz., *E. kerri*, *E. minor*, *E. punjabensis* and *E. binotata*, were studied and it was observed that at Khanewal and Montgomery *E. kerri* predominated while at Sargodha and Bhalwal, *E. minor* was in abundance.

(iv) CENTRAL PROVINCES AND BERAR.

Central Provinces and Berar Cotton Breeding Scheme.—The Central Provinces and Berar Cotton Breeding Scheme was sanctioned by the Committee for a period of five years with effect from the 1st April, 1939, and replaced the Central Provinces Botanical Scheme which terminated on the 31st March, 1939. The object of this scheme is to evolve, by selection or hybridisation, suitable new strains of cotton which can compete successfully with the local *Oomras* in point of ginning outturn and yield and which, at the same time, possesses a staple capable of spinning between 20s to 25s highest standard warp counts. The scheme is worked at Nagpur and at Akola, to suit the special requirements of the Central Provinces and Berar, respectively. The work done during the year is described below under 'Central Provinces Cotton Breeding Scheme' and 'Berar Cotton Breeding Scheme.'

The Central Provinces Cotton Breeding Scheme is concerned with the breeding of improved strains of cotton suitable for Nagpur, Wardha, Chanda and parts of Chindwara districts and capable of replacing the ordinary short staple mixed cotton of these areas.

During the year under review, V. 434 was grown extensively, covering an area of 2,71,600 acres, against 1,38,425 acres last year. The performance of this cotton was fairly good throughout; and on the Akola Farm it gave an average outturn of 685 lbs. of *kapas* per acre, while on the Nagpur Farm the yield recorded was 777 lbs. per acre.

One hundred and eighty nine single plant progenies of different varieties were sown on the Nagpur Farm in small unreplicated blocks, and 32 selections, possessing high ginning and long lint characters, were retained for further study. Twelve strains, including H. 415 and H. 420, and the improved *Verum* and *Bani* strains, were tested against the local *Jari* in the different cotton growing areas of the Central Provinces, but differences in yield due to strains were found to be insignificant, though the H strains showed a high ginning percentage combined with superior quality of lint.

The Cotton Breeding Scheme at Akola is concerned with the production of high yielding superior strains of cotton suitable for the Berars and possessing a staple of at least $\frac{3}{4}$ ", with the softness, colour and strength of V. 434 and a ginning percentage above 33. Breeding of high ginning new strains of *Buri*-cotton for the Burhanpur tahsil also forms part of this scheme. At the Akola farm 968 single plant selections were grown for the estimation of their outturn as compared with V. 434. Detailed observations were recorded on

their performance in the field and those that appeared promising were critically examined in the laboratory with regard to the quality of lint and ginning percentage. Three hundred and sixty-one cultures were finally selected for further study.

District trials—(31 in all)—with V. 434, *Jarila*, H. 415, H. 420 and local *Jadi* were carried in 29 representative localities of Berar; the results showed that in 19 tests the differences in yield, due to varieties, were insignificant. In 12 tests, however, the results were statistically significant.

As a result of selection work in *Buri*, 14 promising single lines with higher ginning percentage than *Buri 107* were isolated. These will be included in the preliminary yield trials in the coming season.

(v) MADRAS.

(a) *Pemphres* Scheme.—This scheme, as originally sanctioned, consisted of two investigations, one for the control of cotton stem weevil (*Pemphres affinis*) and the other for the evolution of a strain in *Karunganni* cotton resistant to the harmful effects of February rains. The first problem was pursued in three directions, botanical, biochemical and entomological. On the botanical side, the aim was to evolve a strain which would not allow the insect time to complete its life cycle inside the stem; on the biochemical side the causes that made strains susceptible to the insect and the factors that helped the plants to resist its attack more efficiently were investigated; on the entomological side, efforts were concentrated to survey the distribution of the insect and to explore the possibility of checking its spread by biological methods. In July 1938, the working of the scheme was reviewed and, as it was felt that the possibilities of biological control were doubtful and that biochemical research was also not likely to lead to any successful results, it was decided that these two sections of the work should be closed down and that the physiological investigations should also be terminated, as the experimental work had been brought to a stage when further investigation could be continued by the Agricultural Department itself. It was agreed, however, that the botanical research should be continued and the work of the past year was concerned with this aspect of the scheme.

As in previous years, two generations of plants were raised during the year—one at Srivilliputhur from March to August, and the other at Coimbatore from September to March. The plant mortality was low and the adult emergence of the insect high in the summer crop raised at Srivilliputhur, in

contrast to the high plant mortality and low adult emergence in the breeding plots at Coimbatore during the cold weather. Co.2 recorded an average of 35% mortality, against 58 in the previous year.

Sixteen selections from the promising cultures of 1939-40 were tested at Srivilliputhur and 12 of these were again tried at Coimbatore. All of them, however, failed to show the desired degree of resistance, whilst only three were superior to Co.2, in respect of yield, at Srivilliputhur. In addition, another lot of 12 cultures from the desirable families were studied in rows at the Coimbatore centre. The results showed that the eight cultures were definitely more resistant than the control. The behaviour of three cultures—7178A/A1, 7178A/A2 and 7178A/A3—was noteworthy in that the mortality and adult emergence recorded were only 3 to 5%, against 20% mortality and 42% adult emergence recorded in Co.2. The yield data, however, revealed that only one culture, 7178/1-D1, combined high yield and low mortality. Cultures 7178A/A3 and 7178A/A2 were the next best. In respect of maturity, all the cultures were later than Co.2. A study of the pest resistance in 52 sibs of 7178A1 confirmed the observation that the derivatives of Moco x Co.2 cross are more resistant than Co.2. Seventeen sibs which were found to be early maturing, were carried forward for further study.

Progeny row tests were carried out with 400 cultures at Srivilliputhur and 714 at Coimbatore. Thirty-nine at the former centre and 98 at the latter, were found to be better than Co.2 in respect of yield. The cultures which recorded nil mortality and nil adult emergence at Srivilliputhur were found to be highly susceptible at Coimbatore, indicating that they were only escapes. Of the 98 high yielding cultures at Coimbatore, only 15 proved to be resistant.

Planting of other crops between the rows of cotton, with a view to controlling the incidence of the pest, was tried in an experiment conducted during the off-season. Co.3, a highly susceptible strain, was used in the trial. The data showed that the lowest mortality was recorded when cotton was grown mixed with *bajra* or *jowar*. Cotton and *Ragi* mixture was the next best. Sowing cotton thick (4" spacing) did not significantly reduce mortality.

(b) Scheme for Improvement of Mungari Cotton in Madras Province.—This scheme was sanctioned by the Committee in 1937 and has for its object the evolution of strains suitable to the red soils and combining the quality

of the *Westerns* with the yield of *Mungari*, to replace the inferior *Mungari*, the existence of which affords opportunities for mixing, with the result that the better cottons of the tract fail to get their proper value. On the black soils of Anantapur, Bellary and Kurnool districts of the Madras Presidency, cottons commercially known as *Westerns* and *Northerns* are grown. These are medium staple varieties, capable of spinning 24s to 32s. The type of cotton grown on the red and mixed soils, on the other hand, is that known by the name of *Mungari*, which is a coarse, short staple variety, similar to *Bengals*, and not fit to spin more than 8s or 10s. The co-existence of these widely different varieties in the same tract favours undesirable mixing, with the result that the better cottons suffer in value. It is to overcome this difficulty that the *Mungari* scheme was started.

During the year under report, seven strains, viz., Co.4, \times 4463, V. 434, P. 710, G. 6, 6042, and M.274 were compared with local *Mungari* cotton on both red and light black soils. On red soil, V. 434 was found to be equal to the local *Mungari*, while Co.4 was distinctly poorer; on light black soil, Co.4 was equal to *Mungari* but V. 434 was distinctly inferior. When the performances on the two types of soil were studied together, strains 6042, M. 274 and P. 710 were found equal to the local. A comparison of the results of yield trials carried out during the past four seasons showed that strain H1 which is being distributed in the ' *Westerns* ' area is not suitable for the *Mungari* tract and that Co. 4 is more suited to light black soils, while V. 434 is more consistent in behaviour, especially on red soils.

Arrangements were made to conduct district trials at seven centres, but the trials at four centres had to be given up owing to serious damage to the plants in the early stages by the red hairy caterpillars. As regards the remaining three centres, the results obtained at one centre did not satisfy the Z test, while at the other two centres, V. 434 was uniformly good.

There is a great prospect of Cambodia strain spreading on account of its higher ginning percentage and freedom from small leaf disease. The yield, however, is reduced in some years by thrips.

During the year under report, 280 promising cultures were tested against the local; 49, out of these, were found to be superior to the control. Arrangements were made to grow V. 434 and Co.4 on 5 acre plots, for purposes of seed multiplication. As, however, the incidence of small leaf disease was very

severe in V. 434, it had to be ploughed up ; in the case of Co.4, a yield of 650 lbs. of *kapas* per acre was obtained.

The damage caused by the red hairy caterpillars continued to be severe. Cucumbers were tried as a trap crop, and the caterpillars were found to prefer them to cotton. Experiments are in progress to determine the method of using this crop for controlling the pest.

(c) Madras Nadam Cotton Breeding Scheme.—This scheme was sanctioned in 1933 with the object of securing one or two suitable annual types of cottons capable of replacing *Nadam* (*G. arboreum* var *typicum* forma *indica*), a perennial variety, in the red soil areas of Salem and Coimbatore districts where, due to poor soil and precarious rainfall, neither *karunganni* (*G. arboreum* var *neglectum*) nor *uppam* (*G. herbaceum* var *frutescens*) can be satisfactorily grown. *Nadam*, being a perennial variety, serves as a breeding ground for pests like the stem-weevil and Pink bollworm during the close period of Cambodia prescribed under the Madras Pest Act. The object was sought to be achieved either by crossing *Nadam* with annual types or by the introduction of suitable early growing varieties.

In seven out of the eight years of study, the distribution of rainfall was unfavourable and the resulting poor stand and low productivity rendered it difficult to evaluate the merits of the several cultures raised in progeny rows. The selection work commenced by collecting the produce individually of all early maturing plants with 3 or more bolls, from bulk plots of different varieties or from segregating generations of hybrid cultures. They were then studied for economic characters and the desirable cultures (with lint length of 22 mm. and above and ginning percentage of 27 or more) were compared with K. I, instead of the local *Nadam* which was not considered a suitable standard for comparison. Nearly all the selections had to be rejected as they did not come up to the required standard. The *Nadam* variety did not seem to contain bio-types useful for growing as annuals. Selections made from the crosses were equally disappointing. In the observation plots, where varieties, strains and cultures were grown with the object of studying their suitability to the tract, none of the annual forms amongst the Asiatic cottons (except two in 1938-39) reached the 300 lb. yield which is required to make their cultivation remunerative to the growers. In the exotic group, it was only in 1938-39 that certain cultures reached the required level but these again went down in the succeeding years. None of the annual varieties—exotic or indigenous—tried so far, has thus been found to be suitable for the ecological

conditions of *Nadam* tract. Further, crossing *Nadam* with *Karunganni* has not given any suitable annual forms that might ultimately prove remunerative to the grower. The pruning of *Nadam* with the object of artificially creating a 'no cotton period' also did not produce the desired effect. The scheme was accordingly closed down on the 13th June, 1941.

(d) **Scheme for Improvement of Cocanadas Cotton in Madras Province.**—

This scheme was sanctioned by the Committee in November 1938 for a period of five years and commenced work from the 1st February 1940. The object of the scheme is to improve the yield and ginning percentage of Cocanadas cotton, preserving, at the same time, the light pinkish colour of its lint, owing to which, it is in great demand for the manufacture of dyed yarns.

The material collected during the survey of the cotton tracts of Nellore, Guntur and Krishna districts in 1940 was sown on the red and light black soil blocks leased at Narasaraopet and on the black soil of the Guntur Agricultural Research Station, with a view to studying the variability in economic characters, such as, earliness, productivity, lint length, ginning outturn, and lint colour. Of the 85 bulks studied, 22 were sown at both centres and in more than one season. Observations were recorded for 200 plants selected at random from each of the above bulks. The data indicated that the material obtained from the Guntur district was the most promising as regards ginning percentage and halo length. Plants combining more than one character were few but there was a fairly wide scope for selection of plants with high ginning percentage.

During the year, the cotton tracts of Godavari district, Markapur and Cumbum taluqs of Kurnool district and Ongole taluq of Guntur district were surveyed and the produce of 711 individual plants was collected.

Six hundred and forty-two single plants selected last year, together with a few plants selected at Guntur for lint colour and lint length, were sown in progeny rows with the object of determining their average values for economic characters. The rows, however, could not be replicated owing to paucity in the number of seeds collected. An analysis of the data showed that in certain types the grade of the lint colour was lower in the progenies than in the parents, while in others such a change was not so perceptible. Arrangements have been made to pursue this question further, as it is considered important to evolve a type which is least likely to be affected in respect of lint colour.

At both the centres of experimentation, the strain I29 was compared with Pained bulk which is highly valued by the trade. The results showed that I29 was better than the bulk in respect of yield, both on red and black soils. The strain is adjudged suitable for spinning 20's highest standard warp counts. As, however, its tint is of a light shade, it was crossed with deeper coloured types to obtain an improvement in the colour.

(c) Scheme for investigating possibilities of control of cotton Stem Weevil of South India.—This scheme was sanctioned by the Committee for a period of one year and three months: it came into operation on the 8th October and terminated on the 31st January, 1943.

The objects of the scheme were:—

- (1) to review the work done on *Pemphigus* prior to and during the enquiry,
- (2) to study the distribution of the pest,
- (3) to examine and record the relative influence of the beetle in cotton and its alternative host plants, and
- (4) to record the parasites found to attack *Pemphigus* as well as their relative influence on the beetle in different host plants.

During the period under review, a rapid survey of the distribution of the weevil was undertaken in selected districts of South India, viz., North Arcot, Salem, Malabar, South Kanara, Trichingopoly, Tanjore, South Arcot, Coimbatore and Chittoor. The data collected showed that in the North Arcot district *Pemphigus* does not occur as a pest of cotton in any of the places surveyed, although isolated specimens of the weevil were present in alternative food plants *Erioforum asculum*. In Salem, only very infrequent instances of the weevil were found in cotton in many of the localities explored except in two taluqs, where it was a serious pest, especially of the perennial variety 'Madam' on which heavy multiple infestations, accompanied by large size galls, began to appear in the second year of its growth. The pest was also found to occur in small numbers in alternative food plants, particularly, *Erioforum asculum*. In Malabar and South Kanara, which are devoid of any cultivated cottons, the breeding of the pest in wild plants and weeds, such as *Triumfetta rhomboides*, *Sida rhomboides* and *Urena lobata*, was found to be profuse. The survey of a few localities in each of the remaining five districts, viz., Trichingopoly, Tanjore, South Arcot, Coimbatore and Chittoor, which are extremely

diverse in agricultural and climatic conditions, showed that *Pemphres* is a common inhabitant of all these districts and that it occurs either in cotton, which is cultivated in small isolated patches, or in one or more of its alternative food plants. The insect, however, does not, at present, constitute a serious pest of cotton in any of the five districts, probably because cotton has only recently been introduced in these areas.

Seasonal incidence of *Pemphres* in cotton was studied and the data, which was based on the individual examination of nearly 7,712 plants, indicated that the weevil passed through nearly three generations by the end of the cotton season in April, with a peak population density during the second wave of incidence which might fall either in February or in March.

The off-seasonal studies have indicated that *desi* cottons do not constitute a very serious factor as a source of re-infestation of the succeeding seasonal crop. 7,779 alternative host plants, composed of 23 species belonging to 9 genera, have been examined and complete data on every species have been gathered. Of the 23 species, as many as 16 have shown weevil attacks. One of the attacked species has been classed as a doubtful host and four are stated to be new.

The study of the incidence and biology of parasites has shown that parasitism in the crops examined was met with in January and February, and also later in the season in July. The highest percentage recorded is only 0.83 in January. About 15 species of parasites of the weevil were collected, either from cotton fields or from alternative food plants. The incidence of *Spathius critolaus* in these was high compared with other species. As it happened to be the most promising of cotton field parasites, its utility for purposes of biological control was studied and it was found that the female parasite, under the conditions of the experiment, was capable of distinguishing the true from false hosts for parasitisation. Its responses, however, to sensory impressions, such as, shape, texture and odour, were rather complex and no single factor by itself seemed to be responsible for the resulting behaviour of the parasite.

The data on the numerical strength and seasonal incidence of the parasitic fauna has revealed that *Entedon* is the most numerous among the parasites and occurs throughout the year save in April. *Dinarmus*, which comes second in order, appears to be rare in the season from January to April. Other species occur only occasionally and in small numbers.

Parasitism has been observed in association with six species of alternative food plants, viz., *T. rhomboides*, *H. citifolius*, *Sida acuta*, *C. olitorius*, *Althea rosea* and *Parsonia zeylanica*. The occurrence of parasites in the last two species of plants was observed for the first time during the investigation.

The thread worm parasites of the weevil were found in association with *T. rhomboides*, and *Malvastrum*. Records obtained indicate that the parasites associated with wild food plants are particularly abundant in waste lands, hill tracts, and forest regions of the west coast districts.

(c) UNITED PROVINCES.

The United Provinces Botanical Scheme—This scheme was sanctioned by the Committee in 1938 for a period of five years. It is concerned with the development of improved strains of *Bengals* cottons for the rain-fed and irrigated tracts of the United Provinces from the material collected in the course of the survey of cottons conducted in Rohilkhand and Bundelkhand and the investigation of the possibilities of growing long staple cottons in the Pink Bollworm controlled areas. Concurrently, the suitability of the United Provinces improved cottons—C. 402, C. 520 and Perso-American—against local and other promising introductions is being tested, both on Government farms and on cultivators' fields.

During the year under review, detailed examination, purification and replicated trials of the material, derived from the original 27,000 single plant collections, were continued at each of the four research centres. Strains 'D' and 'A', obtained from the earliest material collected during 1933 and 1934, will be finally tested under cultivators' conditions before they are released for general cultivation. Strain 'D' has given consistently better yields than C. 520 and, in quality, it is equal to the latter. Strain 'A', on the other hand, is superior in quality to C. 520 and has given better yields under *barani* conditions. The studies on the survey material have indicated that selection in the survey samples is not likely to give strains with higher spinning value than 14's to 16's and that further improvement in the quality of the *desi* cottons must be looked for in hybridisation.

The selections from C. 402 and C. 520 were tested at Cawnpore and Raya and all of them gave higher yields than their respective parents at Cawnpore, whilst, at Raya, the experiment was vitiated owing to an error at the time of

sowing. All the new introductions of *desi* and American cottons are reported to be inferior in one or the other respect to C. 520 and Perso-American.

Of the 24 strains examined for wilt resistance at Raya, C. 520/9 showed an incidence of 4%, besides being resistant to root rot. The performance of this strain, however, requires to be confirmed by further testing.

Comparative yield trials of C. 402, C. 520 and Perso-American, against the survey varieties 'A,' 'D' and 'L,' with local variety as control, were carried out under irrigated and dry conditions throughout the province. Under irrigated conditions, out of 12 trials, strain 'D' gave the best results in 6 places, C. 520 in three and strain 'A,' Punjab-American and local at one place each. Although strain 'D' out-yielded C. 520 at seven centres, the differences were not significant. The results in regard to the general superiority of C. 520 and Perso-American obtained on the cultivators' fields tallied with those on the Government farms.

During the year under review, 36,968 acres were sown under C. 520 and 3,347 acres under Perso-American. Both these cottons, when marketed pure, are said to obtain a premium of annas 8 and Rs. 2, respectively, per maund of *kapas* over the *desi*. It is estimated that the growers of C. 520 and Perso-American get an increased income of Rs. 11 and Rs. 9 per acre, respectively.

(vii) BENGAL.

(a) Comilla Cotton Scheme.—This scheme was sanctioned in February 1933 and came into operation in December 1934. It is concerned with the improvement of the commercial characters of *cernuum* cotton by the isolation of coarse, high ginning and good yielding strains suitable for mixing with wool. In view, however, of the apparent absence of *cernuum* cotton and predominance of *neglectums* in the tract, it has been decided to extend the breeding work to the *neglectums* and to find out whether useful ecotypes suitable for Chittagong hill tracts can be isolated from the *cernuum* collection obtained from the Garo hills of Assam.

During the year under review, 74 villages in the Southern and Eastern parts of the hills were surveyed and 8,841 samples were collected, which are reported to be an improvement over the previous collections, those from the Bhomong Circle especially being found to possess a high ginning percentage of 40 and a staple length of 19 to 22 mms.

From the small amount of seed obtained from single lines, a few bulks were built up for trial on *jhooms* and for seed multiplication. No. 1(9) is reported to have given very satisfactory yield with a ginning percentage of 44.6. It is reported that seed of 15 bulks is available, for the first time, for carrying out yield tests on a large scale in the ensuing year.

(b) **Scheme for cultivation of long staple cotton in Bengal.**—The object of this scheme is to test the possibilities of introducing long staple cottons in the well drained highland soils of Bengal. It is financed jointly on a 50:50 basis, by the Provincial Government and the Bengal Millowners' Association and it came into operation in April 1938. In January 1941, the Indian Central Cotton Committee agreed to provide a supervising officer for the scheme for a period of two years. In addition to supervising cotton cultivation work at the different centres, the officer will also undertake botanical work. During the period under review, all the data collected from the preliminary trials conducted at the Dacca Farm and other places were studied in detail and eight best varieties were selected for further tests. The scheme is being worked in six centres in the highland tracts of the districts of Bankura, Midnapore, Nadia, Murshidabad, Mymensingh, and Rangpur, and the varieties of cotton being tested are Punjab-American 289F and acclimatised Egyptian cotton. The latter, however, apart from its susceptibility to anthracnose, does not appear to be suitable cotton for the areas in question. P. A. 289F, on the other hand, is said to stand up to the conditions quite well, and is reported to have given satisfactory results both in respect of quality and yield during the past two years.

(viii) BALUCHISTAN.

Scheme for co-ordination of Research on Black-headed Cricket in Sind and Baluchistan.—The scheme for the control of Black-headed Cricket in Baluchistan was originally sanctioned in August 1939 for a period of two years to run concurrently and in co-ordination with the scheme for investigation into the Black-headed Cricket in Sind sanctioned by the Committee in January 1938. The combined scheme for the co-ordination of work in progress in Sind and Baluchistan was sanctioned in January 1941, for a period of three years from the 1st April 1941. The objects of the scheme are : (1) to study the life cycle and seasonal behaviour of the pest with special reference to the breeding places in both the provinces, (2) to investigate suitable control measures, special attention being paid to the recent literature on anti-locust measures, and (3) to control and prevent the pest by means of poison-baits.

The Sind part of the above scheme has been dealt with elsewhere.

During the year under report, the control work in Baluchistan consisted, as in the previous year, of the following two items:—

- (1) Checking and destroying the insects at the Khirthar Canal bridges, and
- (2) Controlling the pest in the *tehsil* itself.

It is reported that, unlike last year, no *tid* was seen invading the *tehsil* through the seven bridges across the Khirthar Canal. The control work was co-ordinated on the Sind-Baluchistan border, the Baluchistan staff attending to the operations in the Colony area, and the Sind staff doing work in the adjoining Khirthar area of Shahdadkot *taluka*. Extensive use of the baits was made in 13 villages to check the invading pest and free baiting material was supplied to 9 *Zamindars* in the *tehsil* and the British Cotton Growers' Association who undertook to spread it in their fields.

It is reported that the pest is more or less permanently established in the Usta *tehsil* and that there is a regular migration of the *tid* from the Kachhi district of Kalat State into the *tehsil*.

(ix) HYDERABAD.

(a) Botanical Research Scheme—The object of this scheme which was sanctioned by the Committee in 1929 is to study the several varieties of cotton grown in Hyderabad and to secure from them, high ginning medium staple types, to replace the existing varieties in the different parts of the State. A large number of improved pure strains has been evolved under the scheme, amongst which *Gaorani 6* is the most outstanding. The scheme was extended in July 1938 for a further period of five years from the 1st April, 1939.

Owing to the lack of suitable working accommodation for the staff at Nanded, the research work, during the year, was continued at Parbhani. The rainfall in the Gaorani tract was above normal, and distribution was unfavourable for good cotton yields; the average yield of the improved type, *Gaorani 6*, was only about 150 lbs. of *kapas* per acre, against 133 lbs. of the local variety.

Two preliminary tests were carried out at Parbhani, one with 200 new selections of medium staple *Gaorani* and the other with about 150 slightly shorter stapled but higher ginning types, using G. 4B-5 as 'control' in the

former, and the local variety of Parbhani in the latter experiment. Fifty seven progenies in all were selected on the basis of yield and other characters for further study. A similar test, carried out on a wide-spread plot at Latur, with 203 progenies in single rows alternated with *Gowari Latur*, gave six progenies which showed a mortality of 10-20% compared with 65% or more of the control. With a view to finding fresh plants with desirable characters, crops raised in Parbhani and Latur, from seed obtained from villages and markets and cultivators' crops in parts of the *Gowari Protected area*, were examined and out of 1,000 plants studied for fibre and seed characters, nearly 400 were retained for further study.

Varietal tests were conducted on 3 sites, at the Government Experimental Farm, Parbhani, and at *Madad* and *Latur* and the new Research Station at *Nanded*. Four strains, viz., G 43-5, G 6, 6E-3 and G 115 were tested against *Gowari Urvai* at Parbhani and *Madad* and against the local variety of each place at Latur and Nanded. The fields at Latur and Nanded were not significant. At Parbhani, G 43-5 gave significantly higher yield than *Gowari Urvai* at all the three sites. G 6 outyielded the control at two sites but showed no significant difference from it at the third. The new strain, G 6E-3, equaled *Gowari Urvai* at only one site. G 115, which was reported to be promising in the previous year failed to maintain its reputation. At *Madad*, both G. 6 and its sub-strain, G 6E-3, gave a significantly higher yield than *Gowari Urvai*. G 115 failed here also to maintain its performance of the previous year; it suffered from a severe attack of anthracnose to which nearly 45% of the plants succumbed. In the varietal test conducted at the *Octon Research Station*, Parbhani, with *Gowari Urvai* and 6 other improved strains, viz., G. 127, G 43-5, G 115, G. 128, G. 118 and G. 3, G. 43-5 and G. 127 gave significantly higher yields than G. 3 and G. 118. The differences between the other varieties were not statistically significant.

Two more varietal tests—one at the Government Experimental Farm, Parbhani, with G. 150, G. 155, G. 157, and Parbhani 53 D-4, and the other at the *Octon Research Station*, Parbhani, with G. 150, G. 155, G. 157, G. 157-2, G. 157 and G. 158 were under observation. Parbhani local was used as the control at both the places. G. 150 recorded the best yield at both the localities. The yield of G. 155 was on a par with G. 150 at the former site. These two strains are stated to be promising in respect of both spinning output and spinning performance.

Comparative trials were carried out at the Cotton Research Station, Parbhani, Latur and Madhol. Of the 24 medium staple strains tested against *Gaorani Umri*, at Parbhani, 19 gave significantly higher yield than the control and four of these, viz., G. 4B. 5, G. 115, II-38-4560 and II-38-4665 excelled G. 6 also. Five of the strains included in the experiment were found to be wilt resistant, but only two of these, viz., G.M.-11 and G. 12F-2 approached G. 6 in yield, ginning outturn and fibre properties.

The comparative trials conducted at Latur and Madhol showed that none of the strains tested combined high yield with wilt resistance. The few wilt-resistant strains found in these trials gave poor yields. They were, however, superior to the local variety in respect of staple length and ginning outturn.

The study of resistance to wilt under field conditions at Parbhani gave about 68 types which were superior to the control in respect of wilt resistance. On the basis of yield, wilt resistance, ginning outturn and other characters G. 12F-2, G.161, II-39-5581 (G. 6) and II-39-5469 (G. 4) appeared to be the most promising. The 16 strains tested on wilt infected plots at Latur did not show any marked resistance to wilt. Out of 206 single plant selections picked during the previous season from wilt plot and resistant types, 11 progenies had a mortality ranging from 10-20% and only six of them gave good yield.

District trials with two improved strains and the local variety were carried out at five centres in the Gaorani protected area, 16 centres in the Oomras tract and three centres in Telingana. Though the results do not lend themselves to a valid statistical analysis, they nevertheless indicate that the improved strains do better than the local at Hadgaon and Deglur in the protected area, that Parbhani-American is suited to the hill tract and G. 16C to the plains of the Oomras area and that, in Telingana, the early maturing variety, G. 3B-1 is promising.

During the year under review, about 5,600,000 lbs. of pure seed of G. 6 was distributed over an area of about 3,50,000 acres; the natural spread of seed covered another 19,000 acres. The entire crop was marketed, ginned and baled under Government supervision and it is estimated that the growers of G. 6 earned an extra income of Rs. 6,00,000. In addition, the extra profit to the cultivators on account of higher yield is estimated at Rs. 5,00,000.

(c) **Hydrabad Bollworm Clean-up Scheme.**—This scheme, which is the outcome of the investigation conducted on the bollworms of cotton during the years 1931-37, was sanctioned in August 1936, but, owing to administrative difficulties, it could not be put into operation until the 1st October, 1937. The object of the scheme is to demonstrate the efficacy and practical value of the following control measures against the Pink and Spotted bollworms in a compact area of about 400 square miles in Nanded district :—

- (1) Removal of cotton plants as soon after the final picking as possible.
- (2) Completion of ginning of all seed cotton before the 1st May of each year.
- (3) Removal of alternative host plants and prohibition of cultivation of *khindī* and *ambāzī* in the off season.

The scheme closed down on 31st March, 1941. The research carried out at Parbhani has shown that the Pink and Spotted Bollworms are together responsible for a loss of 10 to 15 per cent of the annual crop, the newly developed, early maturing strains of *Gossypium* suffering markedly less than the existing commercial variety. The Spotted Bollworm passes from one cotton crop to the next by continuing to breed either on cotton plants left standing in the fields after the final picking, or on alternative host plants of *khindī* (*Eriosema esculentus*) and *ambāzī* (*Eriosema canaliculatus*) grown as garden crops during this period. The Pink Bollworm either remains active on the standing cotton plants till the first week of May or goes into hibernation from October onwards. It has been found also that, unlike the case in the United Provinces, the Punjab and Egypt, very few larvae of Pink Bollworm hibernate in seed. Most of the hibernating larvae exist either amongst the fibres of *kayes* or in the cracks that are so characteristic of black cotton soils after the end of the rainy season.

Of the three seasons, during which the clean-up and other control measures were applied, the first two were definitely unfavourable for the development of the pest, whilst the last was quite favourable. As a result of intensive propaganda undertaken for the adoption of clean-up measures, cent per cent of the selected area was cleared every year. It was, however, only in the third year of the scheme that the clean-up work was completed as early as the 15th March. The clearing was done by the *bachar* or the blade harrow and the cultivation of *khindī* and *ambāzī* as imitated crops from April to June was successfully prevented during the entire period of the campaign. The effect of

the clean-up measures was estimated by studying the extent of aestivation of Pink Bollworm in the soil and the incidence of bollworms on the succeeding cotton crop.

The study of the incidence of bollworms in the new crop gave the following results :—

- (1) when the clean-up was done relatively early and the close season was of long duration, the bollworms appeared four to eight weeks later in the cleaned area than in the untreated area,
- (2) the initial attack in the untreated area as compared with the cleaned area was three to six times greater in the case of Pink bollworm and four to ten times in that of Spotted bollworm,
- (3) the attack of Spotted bollworm in the cleaned area remained lower throughout the season, but that of Pink bollworm gradually evened up with the attack in the untreated area as the season advanced,
- (4) the percentage of clean, undamaged cotton was somewhat higher and of damaged and useless cotton slightly lower in the cleaned area than in the untreated area,
- (5) the attack of pink bollworm was less in the early maturing cotton, *Gaorani 6*, than in the existing commercial variety. Correspondingly, the proportion of undamaged ripe cotton in *Gaorani 6* was higher.

These results indicate that the evil effects of boll-worm attack can be reduced perceptibly but that, to derive full benefit, the clean-up measures must be carried out extensively as soon after the final picking as possible.

In order to give effect to the results achieved under the scheme, the Hyderabad Agricultural Department proposes to issue instructions to the Revenue staff to ensure that the cultivators and the owners of fields carry out the prescribed measures. In addition to clean-up work, the following measures have been included in the propaganda programme of the State Department of Agriculture :—

- (1) Completion of ginning of *kapas* before the 30th April, and
- (2) Discouragement of the cultivation of *bhindi* and *ambadi*, as irrigated vegetables, during the period 15th April to 30th June.

A 'Comprehensive Pest Act,' providing for compulsory clean-up of cotton fields and the adoption of other control measures against the bollworms, is under the consideration of the State Government.

(c) **Scheme for inclusion of Northern and Western Cottons in Programme of work of Dry Farming Scheme at Raichur.**—This scheme has a two-fold object, viz., (1) to consider the possibility of growing medium and long staple cotton in short staple areas in India, and (2) to find out how far the devising of dry farming methods would go hand in hand with the successful growing of such cottons in the dry and low rainfall tracts of the country. It was sanctioned by the Committee in March 1937 and is due to terminate on 31st March, 1942.

The season, during the year, was characterised by excessive rainfall which amounted to 36.14" against the annual normal of 26". Heavy showers were received immediately after sowing and caused considerable damage to the young crop in some plots, vitiating the effect of the treatments. Sowings were done in rows, 24" apart, with a 9" distance between plants in the row. The work was carried out on the lines of the previous year. The following four experiments were under study :—

1. Manurial *cum* Varietal experiment,
2. Tillage experiment,
3. Bunding and Scooping experiment and
4. Observation plots.

Manurial *cum* Varietal experiment.—This was a complex experiment, involving three varieties, viz., Hagari 1, Nandyal 14, and the Local and three treatments, viz., oil-cake (groundnut), compost, and no manure; the application of oil-cake and compost was on a nitrogen basis of 30 lbs. per acre. Manuring appeared to have the effect of hastening the maturity of the crop. The yield data showed that oil-cake gave a significant increase of 15% of seed cotton over the control, but no such advantage was noticed in favour of compost. N. 14 and H. 1 gave increased yields of 6.58% and 1.17%, respectively, over the local, but the results were not statistically significant.

Tillage experiment—This experiment was designed to test the effect of (a) deep-ploughing with subsequent harrowings, (b) cultivation by tine-tooth cultivator only and (c) cultivation by blade harrowing only. Differences during crop growth were not perceptible and final yields revealed that the increase noted in the case of treatments (b) and (a) over (c) were not significant.

Bunding and scooping experiments—The inclusion of 'Scooping' in the experiment was an additional treatment to 'Bunding' and 'No bunding' tried in the past year. Scooping was done simultaneously with bunding by working the Basin Lister, with the object of throwing the soil into a number of pockets for holding the rain water. This operation was repeated after each harrowing. Though the mean yield per acre was 607 lbs. of seed cotton, the treatments did not show any significant differences, probably due to loss of treatment-effect by the heavy rainfall received during the season.

Observation plots.—Eight varieties, including the local, were tried in duplicate plots. It was found that N. 14, notwithstanding late flowering, matured early; H. 1 and R.K. 15 proved to be earlier than either *Jayawant* or *New Jayawant*. As regards yields, H. 1 gave the best performance, closely followed by *Gadag 1*.

(d) *Scheme for improvement of Kumpta Cotton*.—This scheme was sanctioned for a period of five years and it came into operation in November 1937. The object of the scheme is to develop certain strains of *Kumpta* cotton bred from the local variety of Raichur which, in the preliminary tests conducted at the Government Experimental Farm, Raichur, before the sanctioning of the scheme, had given better yields of both seed-cotton and lint than either the local variety or improved *Jayawant*. After two years' work under the scheme, a strain known as Raichur *Kumpta 15* was selected for further development. It was sown in 1939-40 on an area of about 40 acres in a cultivator's field, and an average yield of 293 lbs. of seed cotton per acre was realised. Though this yield was a good deal better than the average yield of the local variety in the adjoining fields, the strain proved to be very susceptible to the wilt disease. The Committee, therefore, recommended that, on account of its wilt susceptibility, Raichur *Kumpta 15* should not be distributed, that Raichur *Kumpta 19* should be tested for its wilt susceptibility or resistance and that attempts should be made at once to produce a *Kumpta* type with wilt resistance. The work under the scheme in 1940-41, therefore, consisted of comparative trials of the most promising new strains, their parent variety and the imported types and a preliminary test in wilt-sick soil at Hanshihalhuda (a village about six miles from Raichur).

Of the new strains included in the varietal test at the Raichur Farm, Raichur *Kumpta 15* gave the highest yield, the difference in its favour being

statistically significant. It also out-yielded the local *Kumpla* as well as the imported variety, *Hagari*. Raichur *Kumpla 19*, unlike in the previous years, gave the lowest yield. The failure of Raichur *Kumpla 19* is ascribed to its late maturing habit, on account of which, it suffered the most from the long dry weather that characterised the year under review. In spinning performance, Raichur *Kumpla 15* showed a slight improvement over last year. Raichur *Kumpla 19* and the local variety maintained their previous position, while *Hagari* showed a distinct falling off.

Another yield trial with the three Raichur strains, the imported variety *Jayawant* and the local variety, was conducted at Kopbal in the south-east corner of Raichur District. As in the previous year, *Jayawant* gave significantly higher yield than any of the three Raichur strains. This supports the view expressed last year that the strains produced at Raichur for the central and eastern parts of the district are not likely to prove suitable for Kopbal area.

Several other strains of local *Kumpla* are reported to have given promising results at Raichur in a preliminary comparative test. The important ones amongst these are Raichur *Kumpla 21*, Raichur *Kumpla 32*, Raichur *Kumpla 36* and Raichur *Kumpla 37*. Raichur *Kumpla 15* and *27* also maintained their position, but Raichur *Kumpla 19* failed to do well in this experiment also. Amongst the imported varieties, *Nandyal 14* is reported to be the only one that gave a fairly high yield; its ginning outturn, however, is distinctly lower than that of the local variety. The other imported types, viz., *Hagari*, *Karunganni 1* and strain *19* gave markedly low yields.

The wilt tests carried out during the year showed that Raichur *Kumpla 19*, Raichur *Kumpla 25* and the Poona type K. F. T. 12 are fairly resistant to the disease. There were, in addition, 24 progenies (twelve of which originated from Raichur *Kumpla 15*) which suffered much less mortality than the local variety. These will be studied further in the coming season.

By arrangement with the Deputy Director of Agriculture, Karnatak Division, comparative tests with the local variety, Raichur *Kumpla 15* and Raichur *Kumpla 19*, were carried out at six places. In these, Raichur *Kumpla 15* is said to have given the highest yield in two, and Raichur *Kumpla 19* in three trials. It is proposed to repeat the experiments before either strain is recommended to the cultivators for extensive cultivation.

(x) BARODA.

(a) Baroda Root Rot Scheme.—This scheme which has for its object the study of the root rot disease of cotton in Baroda and the production of strains resistant to it, has been in operation since February 1932.

During the year under review, the presence of nematodes was observed in the interior and exterior of the affected roots. Sixty progenies of *Karkhadi* selections were tested under optimum conditions of infection in the glass house and forty-nine resistant plants were selected; these will be tested in the field next year. It was observed that the sowing of cotton alternated with other crops, such as, *bajri*, rice, *sann*, *variali* and *tur*, does not reduce the percentage of mortality due to the disease.

In the breeding section, 5 best plants from each of the 12 families of *Karkhadi* isolated from the general *Kharkhadi* bulk were tested in compact family blocks for resistance to root rot and yield, but statistical examination did not reveal any significant difference in the families. In the progeny row trial with 60 best *Karkhadi* plants, no significant differences were observed as regards mortality due to root rot. The percentage of mortality in these experiments was 23 against 96 suffered by Broach 9. Family 25, with 12% mortality, is reported to be the most promising of all the families tested. In the yield trials and spinning tests, *Karkhadi* selections again proved inferior to Broach 9. It is stated that attention, in future, will be concentrated on the isolation of highly resistant *Karkhadi* strains, with a view to using them as parents in crosses with other quality cottons.

A large number of varieties, both foreign and Indian, was tested for resistance to root rot, but none of them showed any promise. Several crosses were made between *Karkhadi* and *herbaceums*, such as 1027 A. L. F., Seg. 76-12 and Broach 9, and between *Karkhadi* and *arboreums*, like *Verum*, *Gaorani*, *Karunganni* and *Jarila*, but, due to unfavourable weather conditions, the percentage of success was small. The successful crosses will be tested in the ensuing year.

(b) Plant Puller Propaganda Scheme.—This scheme, which aims at the eradication of the Spotted Bollworm by the uprooting of cotton stalks by the use of the plant puller, came into operation on the 1st January, 1936, and terminated on the 30th June, 1941.

During the year under review, owing to the prevailing high prices of iron and the relatively smaller demand for plant pullers in Navsari, extensive

work in that district was not undertaken and only 691 pullers were sold. In Baroda district, the number of plant pullers sold was 4,906 and the area handled 281,250 acres. Six different leaflets, on the use and efficacy of plant pullers, were printed and distributed freely. Plant pulling competitions were arranged at suitable centres and it was demonstrated to the cultivators that the time taken to clean the fields with the pullers was not more than that required for digging them with *kudalis*. It was also demonstrated that the fields cleaned with pullers give higher yields than those cleared with *kudalis* (about 10% more on an average).

(c) Scheme for improvement of Mathio cotton at Amreli.—This scheme has for its object the improvement of *Mathio* mixture in respect of yield, ginning percentage and quality and the trial at Amreli of the early strains of *Wagad* evolved at Viramgam with a view to replacing, if possible, inferior *Mathio* by early *herbaceums*. The scheme came into operation in June 1937.

During the year under review, 10 *Mathio* selections were tested in randomised replicated progeny rows, with C. 520 and local as controls; the results showed that No. 7 was significantly better in yield than all the other selections but its superior yield over C. 520 and local was not statistically significant. Out of another lot of 14 selections under trial during the season, three selections, viz., Nos. 17, 18 and 19, were retained for inclusion in the varietal trial. This year's varietal test was carried out with two improved *neglectum* strains, viz., *Banilla* and *Jarila*, three promising *Mathio* selections viz., S. 10, S. 7, S. 9, two 'Bengals' strains, viz., C. 420 and C. 520, Khandesh, N. R. and local *Mathio*. None of the selections, including No. 7, was found to be superior to C. 520, either in respect of lint yield or staple length. The data collected during the last four years for *Jarila*, *Banilla* and Khandesh N. R. has shown that, in so far as quality and resistance to *Fusarium* wilt are concerned, *Jarila* is the best. It is, however, late maturing and is, therefore recommended for trial in areas where wilt is prominent or where the local *Mathio* ripens late, e.g., Wankaner State and parts of Amreli. In respect of lint yield, C. 520 has given the best results.

(xi) BIKANER.

Bengals Cotton Improvement Scheme.—The opening of the Gang Canal under the Sutlej Valley Scheme resulted in the colonization of a new and virgin area, known as the Gang Canal area, with immigrant peasants, mostly

from the Punjab, who were accustomed to the cultivation of the Punjab *desi* and American types of cotton. These cultivators found it difficult to successfully cultivate cotton under local conditions, evidently because the new environment was not quite the same as they were accustomed to in the Punjab. This scheme, was therefore, started in January 1931, for the purpose of studying the local problems of the agriculturist and for obtaining by selection and hybridisation one or more superior types of cotton suitable to the locality. Until 1934, the botanical work was confined to the testing out of a large number of outside varieties, both *desi* and American. After that year, however, extensive survey of the Rajputana tract was undertaken to collect breeding material; at the same time, extensive trials of the few selected cottons from outside were continued to test their suitability to the tract. Agronomic work was pursued intensively from the beginning of the scheme. At the end of the first five years, it was found that C. 520 was the most profitable cotton to grow in the tract and that the American cottons were generally unsuitable because of their low yield and susceptibility to disease. Also the staple of Punjab-American cottons was found to deteriorate both in length and strength when grown under Ganganagar conditions. A large amount of data and useful information regarding sowing times, seed rate, frequency and distribution of irrigation, optimum spacing for the *desi* and American cottons, rotation and manuring have been collected.

Since 1934, greater attention has been paid to selection and breeding problems; the results obtained so far are summarised below :—

- (1) Re-selection in C. 520 has yielded strains which show much better germination possibly also a little higher yield than C. 520.
- (2) Some of the local selections have proved better yielders than C. 520, but are poorer in quality.
- (3) It appears doubtful whether mere selection would improve the quality of the *desi* cotton.
- (4) Breeding tests have shown that there are possibilities of improving the quality by hybridization. As regards cottons that may be used as parents, the set C. 520 \times *Bani* appears to offer the best chances of achieving the desired results.

- (5) For the last two years P. A. 289F has done as well as C. 520 but it suffers from immaturity of the seed.
- (6) In a variety *cum* agronomy experiment, interesting results have been obtained which show that the *desi* cotton (C. 520) can respond as well as the American to more favourable conditions—liberal watering and manuring, etc.

During the year selections from *Bengals* were again compared with C. 520 and *Sanguineum* 119; R. 18 proved to be superior to either of the latter strains in respect of yield, ginning percentage, fibre length and spinning value. It is considered, however, that R. 18 probably represents the limit of improvement by selection in the local material; further improvement will have to be looked for from hybridisation. Amongst the several crosses in various stages of trial, those between *Bengals* and Shan material were observed to be the most promising. Of the three American varieties under test, P. 289F/43 was the earliest to mature; it was also the least affected by 'tirak' and gave the highest return per acre. It is proposed to recommend this variety for cultivation in the Canal Colonies. The general impression that the seed obtained from the cotton crop grown in Ganganagar is unsatisfactory and that the required seed should be obtained from the Punjab annually is not borne out by experimental evidence. During the year under review, the response to manuring and irrigation was again studied, the varieties used being P. 289F/47 and C. 520. Heavier irrigations gave better stand, but the response to manuring was not appreciable.

(xii) MYSORE.

Mysore (Doddahathi) Cotton Scheme.—This scheme, which was sanctioned in 1935, is concerned with the breeding, from the local *Doddahathi* or American cotton, of suitable types, resistant to "red leaf" disease which stands in the way of the expansion of this crop in the Irwin Canal area in Mysore State. During the year under review, four varieties of cotton, *viz.*, M.A. II, Co. 3, Co. 4 and Co. 1267, were tested in randomised plots, with three different spacings (3'×1½'; 3'×3'; and 4'×3') and three levels of nitrogen (ammonium sulphate at the rate of 251 lbs., 200 lbs. and 500 lbs. per acre). M.A. II was found to yield better than Co. 4 and the yield from 3'×1½' spacing was significantly higher than that from the other spacings. The highest yield is reported to have been obtained from plots manured with 500 lbs. of ammonium

sulphate per acre. Another manurial trial confirmed the superiority of M.A. II over Co. 3 and Co. 4 in respect of yield. Manurial treatments with 50 and 100 lbs. of nitrogen per acre are stated to have given significantly better yields than the control. The same quantity of nitrogen when applied in four equal doses, instead of in a single dose, at the time of sowing, not only gave higher yields but also produced a greater number of healthy plants than the control plots. On the basis of yields obtained with the several treatments, it was found that 50 lbs. of nitrogen applied in four equal doses was more remunerative than the other treatments.

At the Hebbal farm, under rainfed conditions, M.A. II gave significantly higher yield than local *Doddahathi*, Gadag I and Co. 3; Co. 4 recorded significantly better yields than Gadag I and Co. 3.

Amongst the several hybrid populations under study, F3 of crosses of *G. purpurascens* with M.A. II and Co. 2 appeared to be promising.

M.A. II is reported to be gaining in popularity in the rainfed tracts of Banavar, Arsikere, Closepet, Hunsur, Chennapatna and Chitaldrug taluks and seed of this strain, sufficient to cover 3,000 acres, was distributed in these taluks. Seed of Co. 4 is being distributed free for cultivation over a large area brought under irrigation by the newly formed branches of the Irwin Canal in Maddur, Malavalli and Mandya taluks.

CHAPTER IV.

SEED DISTRIBUTION AND EXTENSION SCHEMES.

For a considerable period, the Committee restricted its grants to agricultural research, but in 1929 it was decided that the time had come to add its support to the efforts already being made to bridge the gap between the experiment station and the cultivator, and to supplement the funds which the Agricultural Departments were devoting to the introduction of improvements into agricultural practice. Special attention has since been devoted to seed distribution schemes, and to the more extended distribution of pure seed of improved varieties of cotton. During the period under review, there were seventeen seed distribution and extension schemes in operation in the various cotton growing provinces and States; a brief report on the working of these schemes is given below :—

1. BOMBAY.

(a) **Surat Seed Distribution Scheme.**—This scheme was first sanctioned in November 1929 for a period of two years. In December 1931, it was extended for another two years, pending the final decision of the Committee on the cotton policy to be adopted in the Surat area; in January 1934, after a thorough examination of the relative merits of 1A and 1027 A.L.F., the Committee decided in favour of the latter and extended the scheme for the distribution of 1027 A.L.F. seed in the Surat area.

During the year under report, the Agricultural Department controlled a seed multiplication area of 20,640 acres (including 1,094 acres grown with farm pedigree seed), against 17,874 acres (including 1,687 acres with farm pedigree seed) last year. 23,68,355 lbs. of seed were distributed (16,74,755 lbs. in British areas and 6,93,600 lbs. in Rajpipla State) against 22,73,633 lbs. (15,95,061 lbs. in British areas and 6,78,572 lbs. in Indian States) in the previous year.

Inspection and survey of the cotton area in Surat are reported to have revealed that Selection 1A has spread considerably in Surat and South Surat area and that the general tendency of the cultivators is to grow Selection 1A, either pure or as a mixture, in preference to pure 1027; further that the 1027 A.L.F. cotton area, which was formerly assumed to be pure, is now getting

mixed with inferior high ginning varieties. The uncontrolled area shows appreciable mixture with such varieties and many growers are said deliberately to mix up seed supplied for cultivation even in the controlled area. The difficulty experienced in the sale of pure 1027 A.L.F. cotton at remunerative prices is stated to have created an unfavourable atmosphere for the future expansion of this cotton.

During the year, guaranteed pure 1027 A.L.F. was sold under two AG-MARK labels—red for “pedigree” cotton and black for “certified” cotton. It is reported, however, that Agmarked 1027 did not fetch any higher premium than that obtained in the past years when no ‘AGMARK’ was applied. 559 bales of “pedigree” (AGMARK red label) cotton and 4,025 bales of ‘certified’ (AGMARK black label) cotton were sold at premium of Rs. 6 to Rs. 22. Owing to the absence of ready demand, some of the bales of 1027 had to be sent to Bombay in tender.

The following table gives the comparative figures of yield, ginning percentage and price of 1027 A.L.F. and Selection 1A :—

Name of Variety.	Yield of seed cotton per acre in lbs.	Ginning percentage.	Yield of lint per acre in lbs.	Price of lint per candy. (800 lbs.)	Price of lint yield per acre.
				Rs.	Rs.
1027 A. L. F.	360	33.3	120	320	48
Selection 1A	400	37	148	295	54/9

The table shows that the grower of 1027 A.L.F. gets Rs. 6-9-0 less per acre than the grower of Selection 1A. The position indicated above is reported to have been in existence for the last five years, and it is stated that the continuance of the policy to favour 1027 in the Surat area can only be justified if an appreciable premium can be obtained for this variety over a number of years and under varying market conditions, to compensate for the reduced outturn per acre of *kapas* and lint compared with Selection 1A..

(b) Scheme for control of Selection 1A cotton.—This scheme was sanctioned in November 1938, for a period of three years, subject to the condition that it should come into operation only if and after the Government of Bombay had isolated Olpad and part of Chorasi Taluka, and that it should continue only so

long as this area was effectively isolated. On the fulfilment of this condition, the scheme came into operation in February 1940. The objects of the scheme are (1) to confine the growth of 1A, as far as possible, to Olpad Taluka, by restricting the movement of cotton and cotton seed out of that area and by making provision for pure seed of Selection 1A for cultivation within the Taluka area, and (2) to check the cultivation of 1A in the rest of the Surat area by arranging for the distribution of adequate quantities of pure seed of 1027 A.L.F. and by intensive propaganda against Selection 1A. Since the commencement of the scheme, 10 check stations (4 on the Tapti river and 6 on the Kim river) were established to prevent illicit import of cotton by road from Olpad to the Surat and Ankleshwar areas. Ginned cotton was allowed, under licence, to be transported to Surat for being pressed and marked "OLPAD" before sale. The work was supervised by the Agricultural Overseer and 20,172 bales in 1940 and 15,380 bales in 1941 (up to the end of May 1941) were thus marked.

A survey made between December 1940 and May 1941, with the object of estimating the extent of the spread of 1A cotton in the Surat and South Surat areas, revealed that, in Choras Taluka, 15 out of 46 villages grew Selection 1A and the rest either 1027 A.L.F. or local; in other talukas, Selection 1A was grown in all the villages to the extent of 30% to 100%. It was further observed that Selection 1A itself contained a mixture of other varieties to the extent of 30%. An analysis of the prices obtained for pure 1027 A.L.F. and pure Selection 1A showed that pure 1027 realised, in 1940, a premium of Rs. 14 to Rs. 20 over local and Rs. 20 to Rs. 22 over Selection 1A, and in 1941, a premium of Rs. 13 to Rs. 18 over local and Rs. 17 to Rs. 23 over Selection 1A (marked OLPAD). The difference in price between pure 1027 and pure 1A is, however, considered quite inadequate to make up for the lower yield and ginning outturn of 1027 A.L.F. and it is reported that as a result, 1A is gaining favour with the growers.

(c) **Jarila Seed Distribution and Extension Scheme.**—This scheme was sanctioned in March 1937 for a period of ten months in the first instance. It was extended in January 1938 for a period of one year. In November 1938 for three years and again in July 1941 for a further period of five years. Its original object was to replace *Banilla* in the Khandesh tract with *Jarila*, which is wilt resistant, over an area of some 1,55,000 acres. In view, however, of the general suitability of *Jarila* for the Khandesh area, the expansion now aimed at is 8,00,000 acres, out of a total cotton area of 11,00,000.

The scheme is operated in five stages of which the first two are the Government Farms at Jalgaon and Bhadgaon. The seed produced at the Jalgaon Farm is used for further multiplication in the wilt affected regions, and that at Bhadgaon Farm for the wilt free zone of Khandesh.

Stages I and II.—During the year under report, 4,653 lbs. of seed were produced from the Farm area. These will be multiplied in 1941-42 over an area of 100 acres in Stage II. 32,600 lbs. of seed from Stage II were handed over to the Cotton Superintendent, Jalgaon, for further multiplication in Stage III. All the cotton produced in Stages I and II was ginned in the Farm gin and sold at a premium of about Rs. 25 to Rs. 30 'ON' Broach and Rs. 53 to Rs. 58 'ON' Oomra.

Stages III, IV and V.—During the year, 5,26,116 lbs. of seed, sufficient to cover 26,236 acres, were distributed. The natural spread is estimated at 1,73,334 acres, bringing the total area under *Jarila* to 2,00,000 acres, against 6,00,000 acres proposed to be covered under the scheme. It is stated that arrangements have been made for stocking 9,08,180 lbs. of *Jarila* seed, sufficient for 48,860 acres. The total area expected to be covered under controlled seed of *Jarila* in 1941-42 is 1,90,000 acres.

The cotton from the fields of the registered seed growers was ginned under departmental supervision and 1,097 bales were sold by auction at a premium of Rs. 35 and Rs. 62 per *candy* over Broach and local respectively.

(d) Deccan Canals (Banilla) Seed Distribution Scheme.—This scheme was sanctioned in January 1934 for a period of five years and came into operation in April 1934. In August 1939, a further extension for five years was sanctioned. The object of the scheme is to distribute seed of *Banilla* to enhance general cotton yields and to improve the quality of the cotton in the Deccan Canals tract in the Poona, Sholapur and Ahmednagar districts.

As the crop did not grow well during 1939-40 at the Kopergaon Farm, the venue of seed multiplication was changed and organised on new lines in the Baramati tract. An average yield of 1,000 lbs. of seed cotton was obtained in this tract, against 200-300 lbs. at Kopergaon last year. 3,500 lbs. of pedigree seed were supplied to the cultivators and grown on 300 acres of land in the villages of Sansar, Lasurne, Kanneri, Tawshi, Udhat, etc. From the seed available, 18,600 lbs. of pedigree seed, of 80% viability, were obtained and supplied to the cultivators. The area under *Banilla* was 7,300

acres, which is 33% of the area (21,000 acres) proposed to be covered with this variety. The enhanced value obtained by growing *Banilla* was estimated to be about Rs. 10 per acre.

(e) B. D. 8 Seed Distribution Scheme.—This scheme, which has for its object the distribution and extension of B. D. 8 cotton in the Broach cotton growing tract of the Bombay Province, was sanctioned in August 1935, for a period of three years, and came into operation in December 1935. It was extended, in July 1936, for a period of five years. During the year under report, the total area under B. D. 8 cotton in Broach district (excluding Ankleshwar taluka) was 9,728 acres, against 30,951 acres last year. The low acreage was due to its failure to obtain proper premium in the previous year. The Agricultural Department controlled 4,156 acres for seed multiplication, including 1,124 acres grown with pedigree seed from the Government Farm, Broach. 107,480 lbs. of seed of B. D. 8 (7,920 lbs. of pedigree seed and 99,560 lbs. from the inner reserved area) have been purchased for distribution in the coming season. In addition, 53,760 lbs., of seed from the inner reserved area have been supplied to cultivators in Kaira and Panch Mahals districts. B. D. 8 cotton was ginned under Departmental supervision and 691 bales from the controlled area were sold at a premium of Rs. 85 to Rs. 132 'ON' Broach, against the premium of Rs. 20 to Rs. 39 'ON' Broach obtained last year. The gross extra income to the growers of B. D. 8 cotton is estimated at Rs. 23,104.

Segregates, 1-2 and 1-6, evolved on the Broach Farm, are reported to have given very promising results during the year and it is expected that they may replace B. D. 8 in the near future.

(f) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme.—This scheme, which was sanctioned in August 1935, for a period of five years, replaced five seed schemes in the Southern Division of the Bombay Province, viz., the Hubli, Gadag, Athani, Haveri and Bailhongal schemes. It came into operation on the 1st June, 1936; in August 1940, it was extended for a period of one year and again in July 1941 for a further period of four years from 1st June 1942. The object of the scheme is to eliminate local mixtures and to introduce pure *Jayawant* and *Gadag No. 1* cottons in the Southern Division of the Bombay Province, so as to cover within five years, 9½ lakhs of acres. The scheme is operated from seven centres, viz., Hubli, Haveri, Navalgund, Bailhongal, Athani, Bijapur and Bagalkot, through the agency of co-operative

societies, under the general control of the Agricultural Department. Decentralisation is the keynote of the scheme, the idea being that no single agency should have too great an area to cover or too great a responsibility to shoulder.

JAYAWANT COTTON.—It is proposed to cover, within five years, an area of 7.75 lakhs acres in Dharwar, Belgaum and Bijapur districts and a part of Satara district. During the year under report, 68,908 acres of the reserved area were rogued and the produce was stocked separately and sold by auction. Out of 63,79,025 lbs. of seed stocked, 48,61,330 lbs. were sold for sowing purposes. The area under pure Jayawant was 5,55,544 acres, and the natural spread was estimated at 1,50,000 acres, bringing the total area to 7,05,544 acres, against 7,70,000 acres last year. The decrease in acreage is attributed to untimely rains. The cultivators' produce was pooled and sold by auction at different centres. 21,953 *dokras** of cotton were sold at a premium of Rs. 9 to Rs. 18 per *naga*† over local. The extra profit realised by the cultivators by growing *Jayawant* is estimated at Rs. 10,50,000. With a view to covering an area of 7,67,000 acres with *Jayawant*, it is proposed to stock 78,38,600 lbs. of seed, of which, 47,49,920 lbs. have already been purchased.

GADAG No. 1 COTTON.—The objective aimed at is to cover, within five years, an area of 1.75 lakhs acres in Dharwar district. During the year, a reserved area of 25,181 acres was rogued. 16,00,900 lbs. of pure *Gadag No. 1* seed were stocked, of which 15,14,800 lbs. were distributed for sowing over an area of 1,51,480 acres, against 14,08,460 lbs. of seed and an area of 1,33,515 acres in the previous year. The natural spread of this variety is estimated at 30,000 acres, making a total of 1,81,480 acres, against 1,50,000 acres in the previous year. 19,799 *dokras* of cotton have so far been sold by auction at a premium of Rs. 5 per *naga* over local. The extra profit realised by the cultivators by growing this variety is estimated at Rs. 3,78,080, excluding an extra gain of Rs. 25,000 due to sales effected through auction. With a view to covering the stipulated area of 1,72,200 acres, it is proposed to stock 18,00,000 lbs. of *Gadag No. 1* seed, of which 14,27,200 lbs. have already been purchased.

(g) Scheme for maintenance of nucleus of pure seed of improved varieties of cotton.—In pursuance of the policy of the Committee that a nucleus of seed

* Weight variable, usually about 330/400 lbs. † 1,344 lbs.

of all approved varieties of cotton should be maintained, a scheme for the maintenance of a nucleus of each of the following seven varieties of cotton was sanctioned in August 1937, for a period of five years:—

- | | |
|-------------------------------|--------------------------|
| (1) 1027 A. L. F. | (5) <i>Jayawant</i> . |
| (2) B. D. 8. | (6) <i>Gadag No. 1</i> . |
| (3) <i>Jarila</i> (Bhadgaon). | (7) <i>Banilla</i> . |
| (4) <i>Jarila</i> (Jalgaon). | |

The total area selfed and the quantity of selfed seed of each variety produced during the year are given below:—

Name of Variety.	Area selfed.		Amount of selfed seed produced. lbs.	Remarks.
	Acres.	Gunthas		
(1) 1027 A. L. F.	1	36	350	Selfed larger area than one acre to take full advantage of short period of boll formation.
(2) B. D. 8	1	0	118	Poor yield due to adverse weather conditions. 89 lbs. of open fertilised seeds also produced. All the seed has been supplied to the Broach B. D. 8 Seed Distribution Scheme.
(3) <i>Jarila</i> (Bhadgaon) ..	1	0	307	
(4) <i>Jarila</i> (Jalgaon) ..	1	0	200	Seeds used for Jalgaon Farm.
(5) <i>Banilla</i>	1	0	191	
(6) <i>Jayawant</i>	2	0	292	Low yield due to continuous rain. 140 lbs. handed over to the Superintendent, Dharwar Farm. 100 lbs. to the Managing Director Cotton Sale Society, Hubli.
(7) <i>Gadag No. 1</i>	2	0	289	Low yield due to red leaf blight. 160 lbs. used for sowing on 16 acres at Gadag, 129 lbs. handed over to the Cotton Overseer, Gadag.

(2) **Sind Seed Distribution and Extension Scheme**—This scheme was sanctioned in December 1930 for a period of three years and came into operation in April 1931.

2. SIND.

The main objects of the scheme are:—

- (a) Trial of tests of improved strains—Sind American cotton.
- (b) Trials of high quality cottons—Egyptian and improved American cottons.
- (c) Demonstration of cotton cultivation on experimental growing areas on new barage lands.
- (d) Seed multiplication, distribution and extension work.
- (e) Propaganda, demonstration and advisory work in connection with the extension of improved varieties of cotton and better methods of cultivation.
- (f) Assistance to cotton growers in marketing cotton.

The work on the Right Bank is mainly concerned with the extension of cotton cultivation, while on the Left Bank, attention is largely devoted to seed multiplication and distribution of improved varieties of cotton and the introduction of better methods of cultivation.

During the year under report, there were 5,12,000 acres under improved varieties, representing 57.1% of the area under cotton in Sind, against 4,57,000 acres, in the previous year, representing 54.7% of the total cotton area. The total area under cotton, in the newly developed cotton tracts, was 1,12,000 acres, against 91,000 acres last year, and 1,08,000 acres in 1932-33. Right across the boundary towards the Punjab, 1,12,000 acres in Sind Province and 11,000 acres of Sind F.W. were cultivated during the year against 7,000 acres of 42-50, 55,000 acres of Sind Province and 1,000 acres of Sind F.W. cultivated in the previous year. About 1,000 acres of Sind F.W. were cultivated in Sind Province and 12,000 acres of Sind F.W. in the Punjab. The average yield in Sind Province was 1,000 lbs. per acre, and it is estimated that the same amount was obtained in the Punjab. The amount of longer, superior quality cotton was 1,000 lbs. per acre for Sind Province and 1,000 lbs. per acre for the Punjab. The extra gross income in Sind Province was Rs. 2,25,000, and in the Punjab, Rs. 2,25,000.

(b) **Scheme for maintenance of nucleus of pure seed of improved varieties of cotton.**—In pursuance of the policy of the Committee for the maintenance of a nucleus of seed of all varieties of cotton, the spread of which has been approved by it, a nucleus scheme for the following three varieties of cotton was sanctioned in August 1937 for a period of five years:—

1. Sind N. R.
2. Sind *Sudhar*.
3. 4F-98.

The scheme came into operation in April 1938. In accordance with the decision of the Committee in August 1940, the maintenance of nucleus of Sea Island 2-4 and Boss III-16 has been transferred to the scheme for the production of long staple cottons in Sind.

The total area selfed and the amount of selfed seed produced in 1940-41 as well as the area sown in 1941-42 under each variety are shown below:—

Name of variety.	Area selfed in 1940-41.		Selfed seed required.	Selfed seed produced.	Area sown with selfed seed in 1941-42.	
	Acres.	Gunthas.	lbs.	lbs.	Acres.	Gunthas.
Sind N. R. ..	1	10	250	420	9	26
Sind <i>Sudhar</i> ..	2	20	575	218	10	0
4F-98	1	10	325	178	8	0

(c) **Financing of Seed Distribution.**—In January 1938, a scheme for the financing of seed distribution in Sind was sanctioned by the Committee for a period of three years, subject to the condition that it would not be put into operation until the rules under the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, have been brought into force. The scheme was not put into operation during the year under report.

3. CENTRAL PROVINCES AND BERAR.

(a) **Verum Seed Distribution and Marketing Scheme.**—In November 1929, the Committee sanctioned, for a period of one year in the first instance, the Central Provinces *Verum* Seed Distribution and Extension Scheme. It started work in September 1930 and was extended annually up to the end of July 1934,

when it was combined with the newly sanctioned scheme for the extension of long staple cottons in the Central Provinces. The combined scheme, known as "Scheme for Extension of Long Staple Cotton and Marketing of *Verum* Cotton in the Central Provinces and Berar" was sanctioned for five years from June 1934. At the meeting of the Committee, held in July 1938, it was extended up to the 31st May 1941, the title being changed to "Scheme for the Extension and Marketing of V. 434 Cotton." In January 1941, a further extension up to 29th February 1944, was sanctioned. The scheme aims at the expansion of area under V. 434 cotton in the seven taluqs where *Verum* has made most headway in the past, the ultimate object being to eliminate all other varieties as far as possible. During the extension period, the objective will be to raise the area in six of the seven taluqs (excluding Ellichpur) to 5 lakhs of acres.

The working of this scheme has been very satisfactory and the five-fold increase aimed at in the past two seasons has been much exceeded. In 1938-39 the area under V. 434 in the seven taluqs referred to above was 25,000 acres and it rose to 86,000 acres in 1939-40 and 2.18 lakhs of acres in 1940-41. Over 30,000 maunds of seed were distributed in the seven taluqs in 1940-41, through departmental and other co-operating agencies. In addition, 6,264 maunds of seed were distributed over an area of 28,000 acres outside the selected taluqs, where the natural spread of the cotton is estimated at 25,000 acres. The total area under V. 434 in the Provinces during the year under review was estimated at 2,71,600 acres. 61,167 maunds of pure seed, ginned at the pooling centres, will be utilised for sowing in the next season. The area proposed to be covered during 1941-42, according to the programme, is 3,50,000 acres.

The total number of bales sold through the departmental pool amounted to 7,065½, out of which, 6,721 bales were of V. 434 the special areas contributing 5,201 bales. The average premium obtained was Rs. 42-13 'on' Broach and Rs. 76 'on' Oomras. It is estimated that the total quantity of *Verum* produced in the Provinces was some 68,500 bales. The total extra income derived by the growers of V. 434 during the year was estimated at nearly Rs. 14,71,000.

(b) Scheme for Distribution and Marketing of Buri 107 cotton.—This scheme was sanctioned by the Committee in July 1938, for a period of three years, and came into operation on the 1st November, 1938. In January 1941, it was extended up to 29th February, 1944. The object of the scheme

is to introduce *Buri 107*—a selection from acclimatised *Gossypium hirsutum* developed under the Central Provinces Botanical Research Scheme—in Burhanpur Tahsil of Nimar district, where the total area under cotton is about 75,000 acres. Commencing with an area of 2,000 acres in 1938-39, the programme was to raise the area under this cotton to 10,000 acres in 1939-40 and 30,000 acres in 1940-41. During the extension period, the aim will be to raise the area to 50,000 acres and to maintain it at that figure. This is likely to be the limit of extension, as the balance of the cotton area in the tahsil is not considered suitable for American cotton.

The working of this scheme has been very satisfactory and the objective of covering 30,000 acres in 1940-41 has been achieved, the area under departmental and natural spread combined being 33,800 acres. As the cultivators could not be induced to pool their cotton through the departmental agency, arrangements were made with local merchants to gin *Buri 107* kapas of approved purity separately and to supply the seed to the Agricultural Department for distribution in 1941. 7,400 maunds of seed, sufficient for 31,800 acres, were then purchased by the Department, but this seed was believed to contain about 2% *Jari* mixture. In addition to the above quantity, 296 maunds of seed of certified purity are available for covering an area of 1,800 acres. Thus, the area proposed to be covered in 1941, under departmental seed, is 33,600 acres.

(c) Maintenance of nucleus of pure seed of improved strains of cotton.—This scheme for the maintenance of nucleus of pure seed for each of the cotton strains, V. 434, *Late Verum*, No. 438 and *Buri 107*, was sanctioned by the Committee in July 1938, for a period of five years from April 1939. The following table shows the quantity of selfed seed proposed to be produced under the scheme and the quantity actually obtained :—

Strain.	Selfed seed proposed to be produced per acre.	Selfed seed produced.
	lbs.	lbs.
V. 434	200	352
<i>Late Verum</i>	200	314
No. 438	200	347
<i>Buri 107</i>	200	244

4. MADRAS.

(a) **Madras Co. 2 Seed Distribution Scheme.**—This scheme was sanctioned by the Committee in August 1932, for a period of five years, for the distribution of Co. 2 seed in the Salem and Coimbatore districts through the agency of the Tiruppur Co-operative Trading Society, by organising a seed multiplication area of not less than 6,000 acres and distributing enough pure seed for 1,00,000 acres every year. The scheme closed down on the 17th August, 1937. In January 1938, the Committee considered proposals for the extension of the scheme, but sanctioned a grant for one demonstrator and one *maistry* to help the Tiruppur Co-operative Trading Society for a period of one year, after which, it was thought that no further assistance from the Committee should be required. In November 1938, the Committee extended the scheme for the distribution of Co. 2 seed in Salem district for a further period of four years and five months. The Madras Government have, however, postponed the operation of the scheme.

(b) **Maintenance of nucleus of pure seed of improved varieties of cotton, Co. 2, H. 1. and K. 1.**—This scheme was sanctioned by the Committee in January 1938 for a period of five years and came into operation in September 1938. The area sowed and the quantity of sowed seed of each variety produced during the year are given below :—

Name of variety.	Area sowed. Acres.	Amount of sowed seed produced. lbs.	How disposed of.
Co. 2.	1.0	710	Transferred to the District Agricultural Officer, Coimbatore.
H. 1	2.5	280	Used for sowing bulk area of Agricultural Research Station, Hagari.
K. 1	2.0	517	Reserved for sowing in Agricultural Research Station, Koilpatti.

5. HYDERABAD STATE.

A Seed Distribution Scheme for the Hyderabad State was sanctioned in November 1929 for three years in the first instance and came into operation in March 1930. It was extended, in February 1933, for three years and again in January 1936, for another six months. In August 1936, it was extended for a further period of 4½ years from the 1st September, 1936. The object of the scheme is to introduce improved strains of cotton in the Raichur District and to market the crop under favourable conditions so as to secure a better premium for the cultivator. During the first two years of the scheme, seeds of *Dharwar No. 1* and *Gadag No. 1* were distributed, but as a result of the experiments conducted by the Hyderabad and Bombay Agricultural Departments, the distribution of *Dharwar No. 1* seed was discontinued in favour of *Jayawant* which was found to be more suitable.

During the year under report, *Jayawant* was the only variety distributed. The following statement shows the progress made in the distribution of seed since the commencement of the scheme and the area covered through departmental effort and by natural spread :—

Year.	Variety of seed distributed.	Quantity of seed distributed in lbs.	Approximate acreage sown with departmentally distributed seed.	Area under natural spread in acres.	Total acreage.
1930-31 ..	Dharwar No. 1 & Gadag No. 1	2,53,068	21,000	..	21,000
1931-32 ..	<i>Jayawant</i> and Gadag No. 1	2,56,670	11,300	15,000	26,300
1932-33 ..	Do. do. ..	3,41,456	18,926	30,000	48,926
1933-34 ..	Do. do. ..	3,29,017	17,000	45,000	62,000
1934-35 ..	Do. do. ..	4,87,781	6,370	15,000	21,370
1935-36 ..	Do. do. ..	5,53,880	41,256	15,000	56,256
1936-37 ..	Do. do. ..	3,74,633	13,871	20,000	33,871
1937-38 ..	Do. do. ..	2,63,945	21,092	16,000	37,092
1938-39 ..	Do. do. ..	2,57,438	22,007	30,000	52,007
1939-40 ..	Do. do. ..	4,49,059	35,000	37,000	72,000
1940-41 ..	<i>Jayawant</i>	5,60,220	45,386	86,329	1,31,715

It will be seen that, out of a total area of 1,80,000 acres (80,000 acres in the Raichur protected area and 1,00,000 acres in the unprotected area adjoining Raichur area) proposed to be covered under the scheme, an area of 1,31,715 acres or 73% of the proposed total was covered by 1940-41.

The Kopbal Co-operative Cotton Sale Society continued to co-operate with the Agricultural Department in the production and sale of pure seed and the holding of auction sales. The price realised for *Jayawant* during 1940-41 at Kopbal was Rs. 50 "ON" Broach, which is the same as that offered in the markets of Gadag and Bellary. The gross extra income to the growers of the improved variety is estimated at Rs. 2,70,015.

With a view to bringing an area of 1,80,000 acres under *Jayawant* cotton, the Agricultural Department has approached the State for an extension of the scheme for a further period of 2½ years and in anticipation of the proposal being sanctioned, arrangements have been made to obtain 5,00,000 lbs. of seed sufficient for 40,000 acres.

6. BARODA STATE.

(a) Baroda (Navsari) Seed Storage Scheme.—This scheme is concerned with the spread of 1027 A. L. F. in the Navsari district of the Baroda State. It was sanctioned in February 1933, for a period of five years, subject to the condition that the Baroda Government would arrange a seed multiplication area of 1,000 to 2,000 acres in that district. At the meeting of the Committee in July 1938, the scheme was extended for a further period of five years from 1st April, 1939.

During the year under report the total area under 1027 A. L. F. was estimated at 80,000 acres of which the area controlled and certified was 34,645 acres. The corresponding figures for the previous year were 75,000 acres and 25,834 acres, respectively. 37,778 lbs. of 'A' grade seed, 2,36,661 lbs. of 'B' grade seed and 2,83,721 lbs. of 'C' grade seed were distributed. To meet the demand for seed in the ensuing year, 26,96,925 lbs. have been purchased and stored.

20 lbs. of seed, supplied by the Cotton Breeder, Surat, were sown on an area of 2½ acres in the Vesma Farm, and 834 lbs. of seed produced will be sown next season in the nucleus seed area of 88 acres on the Farm. Last year this area yielded 30,760 lbs. of pedigree seed which will be given to 'A' grade growers for sowing in 1941-42.

The produce of the improved variety was ginned and baled under departmental supervision and stamped with 'AGMARK.' 5,198 bales were sold at a premium of Rs. 7 to Rs. 19 per *candy*, against 6,745 bales, sold last year, at a premium of Rs. 5 to Rs. 20 per *candy*. A notable feature of the year was that 1027 A. L. F. grown in Navsari district fetched a premium of Rs. 132 'ON' Broach; in the past the premium never exceeded Rs. 65 'ON.'

With effect from the 17th April 1941, the cultivation, except under licence, of any variety of cotton other than 1027 A. L. F. is prohibited under the Baroda Cotton Control Act.

(b) Baroda B. D. 8 Seed Distribution Scheme.—This scheme, which has for its object the extension of B. D. 8 cotton in Baroda District, was sanctioned in July 1938 for a period of five years and came into operation on the 1st April 1939. Its object is to popularise B. D. 8 cotton (which is wilt-resistant and superior in quality to the local cottons) over 51,000 acres of the *Kahnam* black soil area of the Baroda district, north of the river Nerbudda.

During the year under report, 19,240 lbs. 'A' grade seed, 60,560 lbs. 'B' grade seed and 68,040 lbs. 'C' grade seed were stocked at four depots, but, owing to inadequate premium during the previous year and prejudice against this variety amongst dealers on account of its low ginning percentage, the area sown was only 6,107 acres, against 7,680 acres in the previous year. Arrangements for nucleus seed were made by growing selfed seed, supplied by the Bombay Agricultural Department, on an area of 73 acres on the Dabhoi Farm. Owing, however, to unfavourable distribution of rainfall during the season, the yields obtained in many cases were very low; against an expected produce of 1,371 *bhars* of seed cotton, only 736 *bhars* were collected and 493 bales are reported to have been pressed from this produce so far. Of these, 99 fully pressed bales were sold at Rs. 85 'ON' F. O. R. Dabhoi. One firm paid a premium of Rs. 10 to Rs. 12 per *bhar*. Though low premium during the last year, poor yields in the current year and low ginning percentage have proved to be serious handicaps to the rapid spread of B. D. 8, in the hope that the next season would be more favourable, 9,960 lbs. of 'A' grade seed sufficient for 600 acres, 86,400 lbs. of 'B' grade seed sufficient for 5,000 acres and 1,76,640 lbs. of 'C' grade seed sufficient for 6,000 acres, have been stocked for distribution in 1941-42.

Apart from this scheme, the Baroda Government organised seed multiplication over an area of 479 acres at Karjan, and 154 bales of B. D. 8 were produced and sold at Rs. 189 to Rs. 194 per *candy* F. O. R. Bombay.

Since 1929, the undermentioned Seed Distribution and Extension Schemes, financed by the Committee, have closed down after completion of their sanctioned period or for other reasons. The work done under these schemes has been reviewed in previous reports :—

Madras Province :—

- (1) Madras (Tiruppur) Seed Extension Scheme.

Bombay Province :—

- (2) Hubli.
- (3) Gadag.
- (4) Gadag Supplementary.
- (5) Athani.
- (6) Khandesh (*Banilla*).

United Provinces :—

- (7) C. 402.

Punjab :—

- (8) Lyallpur (Ginnery).
-

CHAPTER V.

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON:

Advance in the cotton growing industry of India is closely associated with advance in the Indian cotton mill industry. The Indian mills today consume a quantity of cotton about equivalent to three-fifths of India's total produce and the moiety that they consume is, in the main, the better staple cotton. There is practically nothing to spare of the types of Indian cotton they most require. If India's mills are going to expand, spinning in her own country cotton of her own growing, then it is vital that India's mills shall have the cotton with which to do it. The Committee realises the importance of these things and that is the chief reason why the improvement of the quality has figured so prominently in its programme. The war has brought the problem of the short staple cotton to the forefront, and the Committee's policy of aiming at a better balance of medium and short staple types has been amply justified. It is to be admitted, however, that only a fringe of the problem has so far been touched and much ground still remains to be covered. The following paragraphs, which give a brief account of the progress made in the introduction of improved varieties of cotton in the various cotton-growing Provinces and States of India as a result of the joint efforts of the Indian Central Cotton Committee and the Provincial Departments of Agriculture, indicate the present position:—

BOMBAY.

The total area under cotton in the Bombay Province, including Indian States except Baroda, was 5,478,000 acres, of which the improved varieties constituted roughly 1,405,000 acres or 26% of the total. The position with regard to the various cotton growing tracts is indicated below; the figures in brackets after each tract refer to the area under cotton in the tract in 1940-41:—

Kumbla and Upland tract (including Bijapur District, 454,000 acres) (923,000 acres).—Two important varieties, viz., *Jayawant* and *Gadag 1* are grown in this tract which comprises the districts of Dharwar, Belgaum, Satara and Satara Jagirs and S. M. C. States. *Jayawant* is an isolate from a cross

between *Dharwar I* and *Dharwar II*—two selections from local *Kumpta* cotton. It has a ginning percentage of 28 and a staple length of 15/16" and is capable of spinning up to 26's to 30's warp. Moreover, it is highly wilt-resistant under field conditions and combines all the good characters of the parents. *Gadag I* is a selection from the local Dharwar American cotton; it has a ginning percentage of 33, a staple of $\frac{7}{8}$ " and a spinning capacity of 24's/30's warp. The chief centres of distribution of *Jayawant* are Hubli, Navalgund and Haveri in Dharwar District; Bailhongal and Athani in Belgaum District; and Walva and Tasgaon taluqs in Satara District. *Gadag I* is chiefly grown in the Gadag and Ron taluqs of Dharwar District. The area under *Jayawant* and *Gadag I* in this tract (including *Jayawant* grown in Bijapur District) during the year was about 706,000 and 181,000 acres, respectively. In other words, roughly 65 per cent. of the tract, including Bijapur District, was covered by improved strains.

Barsi-Nagar tract (233,000 acres).—This tract includes Poona, Sholapur and Ahmednagar Districts and Akalkot State. *Banilla*, which is a derivative of a cross between *bani* (a long staple, fine, silky but low ginning cotton) and *Comilla* (a short staple but very high ginning cotton), is the improved variety grown in this tract. With a staple length of 11/16" and a high ginning percentage of 39, *Banilla* has been adjudged suitable for spinning 19's highest standard warp counts. The area covered by it in this tract during the year was 9,000 acres.

Khandesh tract (1,085,000 acres).—This tract covers the districts of East Khandesh, West Khandesh (excluding Nawapur Peta) and Nasik. *Khandesh Banilla* was the original improved strain evolved for this tract, but owing to its susceptibility to wilt, its extension has been abandoned in favour of *Jarila* which is a selection from *verum* evolved under the Jalgaon Cotton Breeding Scheme. *Jarila* is wilt-resistant and spins 24's warp under mill conditions. It has a ginning percentage of 33-35 and a staple length of 3/4" to 7/8". During the year under review it fetched an average premium of Rs. 35 'on' Broach and Rs. 60 'on' the local cotton. The estimated area under it during the year was some 200,000 acres including natural spread, i.e., nearly 18% of the Khandesh tract. Out of the pure seed produced on Government Farms and in controlled areas, the quantity stocked by the Agricultural Department and approved stockists for distribution in 1941-42 season was 3,523, 650 lbs.

Surati tract (432,000 acres).—This tract comprises Surat District, Ankleshwar Taluka of Broach and Panch Mahals District, Nawapur Taluka of West Khandesh District, the Surat States and Rajpipla State, extending to the Navsari District of the Baroda State. 1027 A.L.F. is the improved cotton grown in these areas. It was evolved from a cross between *Kumpla* and *Goghari* cottons and has a staple length of 15/16" to 1" and a ginning percentage of 33-36 and is capable of spinning up to 24's/30's warp. The total area under it during the year was 268,000 acres, excluding Baroda State. The Committee finances a scheme for grading and marking of 1027 A.L.F. cotton in the Surat protected area and 4,837 bales were sold under 'Agmark' at premiums ranging from Rs. 5 to Rs. 26 on the local.

Broach tract (488,000 acres).—This tract includes Broach and Panch Mahals District (excluding Ankleshwar Taluka), Kaira District, States in Gujarat States Agency (excluding Rajpipla and Surat States). B.D. S is the improved strain grown in this tract. It was originally selected from a variety of cotton known as "*Purified Broach Deshi*" grown on the Broach Farm and has a staple length of $\frac{3}{4}$ ", a ginning percentage of 33.7 and a spinning capacity of 30's warp. The total area under it during the year was 10,000 acres and it fetched a premium of Rs. 85 to Rs. 132 on Broach against Rs. 20 to Rs. 39 obtained in the previous year.

SIND.

The total area under cotton in Sind, including Khairpur State was 974,000 acres, of which Sind-American occupied 666,000 and Sind *desi* 308,000 acres. The area under improved varieties was about 87% of the total.

In the Sind-American tract four types of cotton, viz., Sind-American 4F Sind *Sudhar* (289-F-1), Sind-American 289-F types (other than Sind *Sudhar*) and Sind-American 98, are grown. 4F (staple length $\frac{3}{4}$ ", spinning capacity 20's warp) is the original type of American cotton introduced from the Punjab. Sind *Sudhar* (289-F-1) is a high yielding cotton grown all over the Left Bank of the Indus. It is a selection from Punjab-American 289-F and with a ginning percentage of 29 to 30 and staple length 1", it is capable of spinning 32's warp counts. It is resistant to both red leaf blight and jassid attack and can withstand seasonal variations of climate better than the ordinary 289-F and similar cottons. There were some 273,000 acres under it during the year. Under Sind-American 289-F types (other than Sind *Sudhar*) are included

the improved varieties variously known as K.T., N.T., L.S.S., etc. The propagation of these strains has been discontinued by the Agricultural Department in favour of Sind *Sudhar*. Sind-American 98 was evolved from ordinary 4F cotton; with a ginning percentage of 33, and a staple length of $\frac{7}{8}$ " to 15/16", it is capable of spinning 26's warp counts. It is considered to be the most suitable type for cultivation in the new cotton area on the Right Bank of the Indus. There were some 59,000 acres under it during the year.

The improved Sind *desi* cotton known as Sind N.R. or 27 W.N. is the standard *desi* cotton of Sind and is grown in the Nawabshah District and the upper part of Hyderabad District. Sind N.R. gives 16 to 20% higher yield and 4 to 5% higher ginning outturn than the ordinary Sind *desi*. The area under it during the year was 220,000 acres which is 71% of the total *desi* acreage.

PUNJAB.

The total area under cotton in the British districts of the Province was 2,679,000 acres of which 1,437,000 acres were under Punjab-American and 1,242,000 acres under Punjab *desi*. The total estimated area of about 2,120,000 acres (i.e. 79% of the total cotton acreage) under improved varieties during the year was distributed as under :—

(a) <i>Punjab-American varieties :—</i>								Acres.
(i)	4F	..	..	..	..	..	..	931,000
(ii)	L. S. S.	..	..	..	..	..	..	175,000
(iii)	289-F & K.T.	23	..	..	..	..	..	21,000
(iv)	289-F/43	..	..	..	..	..	..	124,000
(v)	289-F/K.	25	..	..	..	..	..	186,000
Total								.. 1,437,000
<hr/>								
(b) <i>Improved desi cottons :—</i>								
(vi)	Mollisoni	..	..	..	..	..	..	629,000
(vii)	Other improved types	..	..	..	..	..	..	54,000
Total								.. 683,000

(i) 4F (ginning % 31, staple length $\frac{5}{8}$ " to $\frac{7}{8}$ ") was the first improved variety to be distributed by the Agricultural Department. It is capable of spinning 20's highest standard warp counts and is grown chiefly in the Canal Colonies, Western Punjab and Fazilka sub-division of Ferozepur District. It is now being replaced by the recently evolved improved strains of cotton.

(ii) L. S. S. a selection from 4F, is chiefly grown in Lyallpur, Sheikhupura and parts of Shahpur Districts. It has a ginning % of 31 and a staple length of 15/16", and is capable of spinning up to 26's highest standard warp counts. When marketed in bulk, L.S.S. fetches a better price than 4F. It is a high yielding cotton but matures late, and, therefore, requires one or two irrigations in October.

(iii) 239-F/43 is a long staple, high yielding, early maturing variety which is at the same time resistant to jassid attack. It gins 29%, and has a fibre length of 1" and a spinning capacity of 35's/40's warp. It is tolerant to shortage of water and matures and gives the first picking at the same time as *desi* cottons and, therefore, does not suffer from early frost. It is most popular in Lower Bari Doab Canal Colony (except Khanewal Division), Nili Bar and inundation tracts, and in Lower Chenab Canal Colony. It withstands late sowing better than other varieties especially in south-western parts of the province, and if, for any reason, late sowings up to the end of June have to be done, this variety is recommended. It has, however, the disadvantage of being, comparatively, a low ginner, 29% against 33% in the case of 239-F/K.25.

(iv) 239-F/K.25 was selected by the British Cotton Growing Association (Punjab) Ltd., Khanewal, in 1932, and is at present grown in Multan and Montgomery Districts and in parts of Bahawalpur State and Sind. With a ginning outturn of 33% and a staple length of 1-1/16", it is capable of spinning 30's warp or 40's weft. Its drawback lies in its susceptibility to jassid attack.

The more important improved Punjab *desi* varieties are *McIlisoni 39* and *119 Sanguineum*.

(v) *McIlisoni 39* (ginning % 35-36, staple length $\frac{5}{8}$ ") is a tall growing variety and gives the highest yield amongst the *desi* varieties. It is very popular with the growers of *desi* cotton in the Canal Colonies.

(vi) *119 Sanguineum* bids fair to become the standard *desi* cotton of the south-western tract of the Punjab. It gives higher yield than the local and its ginning outturn is 36% against 34% of the local.

CENTRAL PROVINCES AND BERAR.

The total area under cotton in the Central Provinces and Berar during 1940-41 was 3,512,000 acres. Improved varieties occupied some 370,000 acres, or roughly 11% of the total. The chief improved varieties are V. 434 and *Buri 107*.

V. 434 is a pure line selection from *Verum*; its chief merit lies in its adaptability to the varying soil and climatic conditions. Besides being resistant to wilt and drought, it possesses prolific flowering capacity, quickness in forming buds and setting fruit, comparative freedom from shedding and excellent lint characters. It has a ginning outturn of 31%, a staple length of about $\frac{7}{8}$ ", and a spinning capacity of 20's/24's warp. It is the best all round strain available at present and is grown chiefly in Nimar, Wardha and Nagpur districts and Berar. The area under it during the year was 272,000 acres and it fetched a premium of Rs. 76 per *candy* over the local Oomras. Apart from V. 434, other *verum* strains like No. 438 and late *Verum* were grown to the extent of a few thousand acres.

Buri 107, a selection from acclimatised *Upland American* cotton, is grown chiefly in the Burhanpur Tahsil of the Nimar District for which it has been found to be particularly suitable. It yields well but suffers from the defect of being a low ginner, its ginning outturn being 27 to 28%. The staple is good, about $\frac{7}{8}$ " to 15/16", though somewhat weak; it is capable of spinning up to 30's warp. The area under it during the year was 35,000 acres. Other *Buri* strains covered 5,000 acres.

MADRAS.

The total area under cotton in the Madras Province (including Pudukkottai and Banganapalle States) was 2,391,000 acres of which 891,000 acres (or 37%) were under improved superior strains. The position of improved strains in the different tracts is dealt with below; the figures in brackets after each tract refer to the area under cotton in 1940-41.

Cambodia tract (523,000 acres).—*Cambodia*, an acclimatised American Upland cotton, is the original improved type introduced in this tract, which comprises the districts of Salem, Coimbatore, Trichinopoly (including Pudukkottai State), Madura, Ramnad, Tinnevely, and South Arcot. This variety is now being replaced by several better strains such as *Cambodia* Co. 2, Co. 3, and Co. 4, etc.

Co. 2, a selection from *Cambodia*, is a robust, jassid resistant, high yielding type possessing large bolls which open widely. With a ginning outturn

of 33 to 35% and a lint length of 15/16" to 1" it is capable of spinning 24's/30's warp. Compared with ordinary Cambodia, Co. 2 is estimated to benefit the grower to the extent of Rs. 15 per acre. Another strain 920 is now gradually replacing Co. 2 in parts of Coimbatore District, on account of its sturdier growth and lesser susceptibility to shedding. The area under Co. 2 (including 920) in 1940-41 was 262,000 acres. Two more strains which deserve mention are the Cambodia Uganda Crosses, Co. 3 and Co. 4, both of which are earlier and more prolific than and superior in quality to either Co. 2 or 920. Co. 4 is a derivative from Co. 2 × A. 12, isolated at the Cotton Breeding Station, Coimbatore. It is earlier than Co. 2 by about three to four weeks, has a staple length of 1-1/32" and spins 40's to 42's warp; its ginning percentage, however, is only 31 against 33 to 35 of Co. 2. Trials conducted over a few years in the Ramnad District have indicated that Co. 4 gives 50 to 80% higher yield than Co. 2. Co. 3 is a strain obtained by hybridising Co. 2 with U. 4. It is as early as Co. 4 but has a finer staple (1-1/16") and a higher ginning outturn (36 to 39%) than the latter. It is capable of spinning up to 50 standard warp counts. In 1940-41, Co. 3 and Co. 4 were grown in Ramnad, South Arcot and Tinnevely Districts over an area of 15,000 acres.

Tinnevellies tract (705,000 acres).—The commercial Tinnevellies grown in Madura, Ramnad, Tinnevely and Coimbatore Districts, constitute a mixture of two cottons—*Karunganni* and *Uppam*. The former is distinctly superior to the latter in general yield, quality and spinning performance. The improved *Karunganni* strains at present being propagated are C. 7, A. 10 and K. 1, which were originally evolved by selection in *Karunganni* at the Koilpatti Agricultural Research Station. C. 7 is suitable for tracts south and east of Koilpatti, while A. 10 flourishes best in the regions north of Koilpatti. Both are alike as regards lint length and ginning percentage, but in spinning performance C. 7 is superior. K. 1 was evolved by re-selection in C. 7 in a year of drought; besides being earlier and hardier than the latter, it does better than either C. 7 or A. 10 under adverse conditions and is not affected by February rains. Further, it has been found to give a higher yield than the local cottons. Owing to its earliness, drought resistance and non-shedding qualities, it is gaining popularity and is expected to replace both C. 7 and A. 10. The improved *Karunganni* cotton has an average staple length of 7/8" to 15/16" and is suitable for spinning up to 24's warp. The area under this cotton in 1940-41 was 206,000 acres.

Westerns tract (817,000 acres).—This tract comprises the districts of Bellary, Anantapur, Cuddapah and part of Kurnool. The improved strain grown in this tract is H. 1, which is a selection from another strain H. 25. Having a ginning outturn of 31% against 27% of the commercial Westerns, and a staple length $\frac{3}{8}$ " to 15/16", H. 1 is capable of spinning up to 24's warp. It is grown chiefly on the black soils of Bellary District and in parts of Anantapur District. There were some 331,000 acres under it in 1940-41.

Northerns tract (180,000 acres).—The Northerns variety of cotton is grown chiefly in the Kurnool District (excluding Pattikonda Taluk). N. 14, the improved strain grown in this tract, was evolved by selection from the Northerns cottons and is considered to be one of the finest indigenous cottons in India. It thrives on mixed soils in years of good rainfall. With a staple length of 7/8" to 15/16", and a ginning percentage of 24, it is capable of spinning up to 24's/26's warp. There were 22,000 acres under it in 1940-41.

UNITED PROVINCES.

The total area under cotton in the Province during 1940-41 was 408,000 acres. The improved varieties, C. 520 and Perso-American, occupied 36,000 acres or 9% of the total.

C. 520 (ginning % 38, staple 5/8") is a selection, superior in quality and yield to the bulk crop of the indigenous mixture of "U. P. Bengals." It is capable of spinning 12's to 16's. The area under it in 1940-41 was 24,000 acres.

Perso-American (ginning % 32, staple 25/32") is an acclimatised foreign cotton; it can spin 30's counts. Attempts are being made to extend the area under it in Aligarh and Budaun Districts. It was grown on 12,000 acres in 1940-41.

HYDERABAD STATE.

The total area under cotton in the State during 1940-41 was 3,458,000 acres, of which, 447,000 acres (or 13 % of the total) were occupied by the improved varieties, *Gaorani* 6, Parbhani-American and *Jayawant*.

Gaorani 6, pure seed of which is being distributed on *tacavi* system in the *Gaorani* protected area of the State, is a selection from the indigenous *Gaorani* cotton. It has a staple length of $\frac{3}{8}$ " and spins up to 30's warp. Out of 934,000 acres in the *Gaorani* tract, it covered an area of 287,000 acres during the year.

Pure seed of Parbhani-American, which is a selection from the local American varieties, is being distributed, on *tacavi* system, in the Aurangabad District. The area under it during the year was 28,000 acres.

Jayawant (same strain as that grown in the Kumpta tract of the Bombay Province) is being extended chiefly in the *Kumpta* cotton protected area of the Raichur District. In 1940-41, *Jayawant* occupied an area of 132,000 acres in the State.

BARODA STATE.

The total area under cotton in the State in 1940-41 was 811,000 acres; improved varieties occupied 94,000 acres or 11% of the total. The position of improved varieties in the different tracts is indicated below :—

Surti tract (224,000 acres).—Surti cotton is grown in the Navsari District of the State. The improved strain being extended in this tract is 1027 A. L. F. which covered an area of 80,000 acres in the Navsari District in 1940-41.

Broach tract (400,000 acres).—The cotton crop of Baroda District is classified under Broach. The improved strain of this tract is B. D. 8, which is extending particularly in Dabhoi, Sankheda, Karjan and Sinor Talukas of the Baroda District, where wilt predominates. The area under it during the year was 7,000 acres.

In large areas of Waghodia and Savli Talukas where damage by wilt is not noticeable, B. 9, an improved type, is in keen demand. It is distinctly superior to the local Goghari and the Agricultural Department had a controlled area of 6,500 acres under it in 1940-41.

Dholleras tract (187,000 acres).—Mehsana and Amreli Districts of the State are included in this tract. In the Mehiana District, the improved strain *Wagad 8*, originally evolved by the Bombay Agricultural Department by selection in *Wagad* cotton is proposed to be extended. 647 acres were maintained under pure *Wagad 8* for seed production. In the Amreli District, pending further breeding work, C. 520 the improved *Bengals* type grown in the United Provinces, is proposed to be extended.

RAJPIPLA STATE.

The total area under cotton in the State during 1940-41 was 144,000 acres, the whole of which was sown with 1027 A. L. F. The import and sowing of *Goghari* or any other short staple cotton are prohibited under the Rajpipla Cotton Improvement Act of 1921. Pure seed of 1027 A. L. F., for distribution to the cultivators, is obtained by the State every year from the Cotton Superintendent, Surat.

CHAPTER VI.

GENERAL.

1. IMPROVEMENT IN MARKETING.

The Committee has not stopped at the production of better cottons but from its inception has devoted special attention to better marketing (in the widest sense of the word). An investigation into the financing and marketing of cultivators' cotton conducted by the Committee established beyond doubt that, in those tracts where regulated markets exist, the cultivators obtain better prices for their cotton and accordingly a recommendation was made to Provincial Governments to take steps for the establishment of such markets. As a result, legislation for the establishment of regulated markets has been enacted in Bombay and the Central Provinces, and in Madras the establishment of such markets has been provided for under the Commercial Crops Markets Act. Hyderabad, Indore and some other Indian States have also passed similar legislation, and open markets have been established.

The passing of the Bombay Agricultural Produce Markets Act, 1939, led to the repeal of the Bombay Cotton Markets Act, 1927, but provision has been made in the new Act to recognise the regulated markets established under the Bombay Cotton Markets Act, 1927. The Rules framed under the new Act were approved by the Bombay Government in June 1941. The following seven markets continued to work as regulated cotton markets under the new Act:—(1) Dhulia, (2) Dondaicha, (3) Jalgaon, (4) Amalner, (5) Baramati, (6) Bijapur, (7) Bailhongal. No new markets have been established under the Bombay Agricultural Produce Markets Act, 1939, but proposals for the notification of a number of markets, throughout the Province, are under the consideration of the authorities concerned.

In the Madras Province, the Tiruppur, Nandyal and Adoni regulated cotton markets continued to function during the year.

In the Central Provinces, a new cotton market was established at Harsud during the year.

In the Punjab, the Punjab Agricultural Produce Markets Act provides for the better regulation of the purchase and sale of and the establishment of markets for, agricultural produce including cotton. During the year the Rules under the Act were passed.

In the Baroda State, the Baroda Agricultural Produce Markets Act has been made applicable to one more market during the year at Amreli, and it is hoped that this market will function in the coming season.

In addition to the 21 markets reported in last year's report as having already been established in the Hyderabad State, the Agricultural Produce Markets Act has been made applicable during the year to Suryapet.

In Sangli State, the Huzur Order regulating the sale and purchase of commercial crops in the State continued to be in force.

In connection with the adoption of a definite cotton policy in Gujarat, the view was expressed that the crux of the whole problem centred round the better marketing of 1027 A.L.F. cotton and it was accordingly suggested that the Agricultural Produce (Grading and Marking) Act should be utilised to enable this cotton to be marketed as a special grade of Surat cotton. The Government of India were accordingly requested to include cotton in the schedule to the Act to enable specified varieties of cotton to be protected under it, the intention being that once cotton is included in the schedule, specified varieties of cotton produced in specified areas could then be stamped with a special mark, the unauthorised use of which would be illegal under the Act. The recommendation was accepted by the Government of India, and 1027 A.L.F. grown in certain tracts in Gujarat (Bombay Province) was marketed under a special AGMARK during the year under review. This arrangement, however, did not have the desired effect as buyers were reluctant to give adequate premium for "AGMARK" bales. This might possibly have been due to the abnormal conditions prevailing in the cotton trade during the season, and therefore in order to furnish additional evidence as to the effectiveness of the system, the arrangement will be continued during the next season. The application of the Rules under the Agricultural Produce (Grading and Marking) Act to 289F/1 (Sind *Sudhar*) has also been approved by the Committee and the required notification has been published by the Government of India. The application of the rules to V. 434 cotton was approved by the Committee during the year.

As usual, Universal Standards were prepared for the following varieties of cotton :—

- | | |
|----------------------------|--------------------------------|
| 1. <i>Bengals,</i> | 8. <i>Kumplas,</i> |
| 2. <i>Sind,</i> | 9. 4F Saw-ginned Punjab, |
| 3. <i>Punjab-American,</i> | 10. 289F Roller-ginned Punjab, |
| 4. <i>Sind-American,</i> | 11. 289F Roller-ginned Sind, |
| 5. <i>Oomras,</i> | 12. 289F Saw-ginned Punjab, |
| 6. <i>Mathias,</i> | 13. 289F Saw-ginned Sind. |
| 7. <i>Broach,</i> | |

Owing to the lateness of the crop, standards for *Dholleras* were not prepared during the year.

Two schemes for cotton marketing surveys, on the basis of the Punjab Survey to which reference was made in last year's report, were sanctioned by the Committee during the year, one for the Madras Province and the other for Gujerat, the adjoining Agencies and States of Kathiawar and South Rajputana.

2. LEGISLATION.

In order to check the spread of undesirable or inferior types of cotton and insect pests and diseases and other malpractices, several legislative measures have been passed by the Central and Provincial Governments on the recommendation of the Indian Central Cotton Committee. A brief account of these is given below :—

(i) **Cotton Transport Act.**—The Cotton Transport Act was passed by the Central Government in 1923, at the instance of the Indian Central Cotton Committee. It enables Provincial Governments to prohibit the import of cotton, *kapas* or seed into specified areas from outside unless required for a special purpose and covered by a licence. Under this Act, protected areas have been notified in the provinces of Bombay, Madras and the Central Provinces and Berar, as also in the States of Hyderabad, Baroda, Indore, Gwalior, Rajpipla, Sangli, Chhota Udepur, Lunawada, Bhaderwa, Kadana, Sant, Jambughoda and Baria. A brief account of the working of the Act in the Provinces and States is given below :—

Bombay.—The protected areas in the Bombay Province remained unchanged. A new zone called the Mahi-Sabarmati zone was added to the

protected areas. In the tract south of the Narbada, where the Act was put into operation in May 1939, half-pressed bales from Olpad were permitted to be transported under licence to Surat for full pressing under departmental supervision and were duly marked "Olpad." The total number of bales thus pressed and sold was 17,164. Licences were also granted for the transport of seed cotton from some villages in Ankleshwar *Taluka* for sale to gins in Olpad as an experimental measure for one year. Under a notification issued by the Bombay Government, import of cotton from protected areas in Baroda State was permitted into the corresponding protected areas of Bombay Province without licence.

In the Karnatak tracts, application of the Act was very effective in the case of imports by rail. To prevent illicit imports by road, check stations were opened on the main roads on the borders of protected areas. During the year under report, there were 20 temporary and 6 permanent check stations. Illicit import of cotton was reported to have occurred to some extent through *kachha* roads. To control such illicit imports entirely or more effectively, some more check stations are proposed to be established. Some cases of fraudulent import were detected and cotton thus imported was sent back in most cases.

Proposals for the inclusion of Nawapur Peta (Khandesh) in the Surat protected area have been submitted to the Bombay Government on the ground that *Surti* cotton, similar to that grown in South Gujerat, is grown in this *Taluk*.

Madras.—The Act is reported to have worked smoothly. There was no change in the protected areas. Up to June 1941, the Act prohibited the import of cotton (*kapas*, ginned cotton and cotton waste) into protected areas, except under licence, by rail and sea only, but during the year, the Madras Government issued a notification restricting imports, under the same conditions, by road as well. It may be mentioned in this connection that under the Rules under the Act, issued by the Madras Government, no restriction is placed on the import of cotton seed into the protected areas. In view, however, of the possibility of admixture resulting, the Government of Madras were requested to consider the desirability of prohibiting, except under licence, the import of cotton seed also into protected areas.

Central Provinces.—The protected areas in the Central Provinces and Berar remained unchanged in the year under review.

The protected areas in the Hyderabad, Gwalior, Indore, Rajpipla, Sangli, Chhota Udepur, Baria, Lunawada, Bhaderwa, Kadana, Sant and Jambughoda States also remained unchanged during the year.

Baroda State.—There was no change in the protected areas. Arrangements are now being made to institute a separate Mahi-Sabarmati zone.

Indore.—The amplification of the Cotton Transport Act with a view to restricting the import of *Bengals* cotton is under consideration.

(ii) *Cotton Ginning and Pressing Factories Act.*—The Cotton Ginning and Pressing Factories Act, 1925, applies to the whole of British India, and practically all cotton growing Indian States have passed similar legislation. Under this Act every bale of cotton is required to be stamped with a special mark showing where it was pressed; the Act also regulates certain matters connected with the management of cotton ginning and pressing factories and makes compulsory the submission by pressing factories of weekly returns of cotton pressed. Modifications in the rules have been called for from time to time, but the working of the Act has undoubtedly been a salutary check on malpractices. The Act, as amended by the Provinces of Bombay and the Central Provinces and Berar, prohibits watering, mixing and admixture of cotton and makes it obligatory on all cotton ginning and pressing factories situated in areas to which the Act is applied to obtain licences for their working. The Government of Bombay have since issued notifications under rule 2A of the Bombay Cotton Ginning and Pressing Factories Rules, 1925, and Section 3A of the Cotton Ginning and Pressing Factories Act, 1925, as amended by Bombay Amendment Act IV of 1936. The provisions in the Act in respect of admixture of cotton are enforced in specified areas by these notifications. The Cotton Ginning and Pressing Factories Rules,† 1941, framed by the Government of Sind, under the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, were brought into force with effect from the 18th April, 1941.

The Cotton Ginning and Pressing Factories (Madras Amendment) Bill was considered by the Committee, which recommended the deletion of clause 4 "3(A) 3" of the Bill and the addition of a new section on the lines of Section 3AA of the Cotton Ginning and Pressing Factories (Bombay Amendment)

Act, 1938. It was further recommended that in adopting Section 3.AA, the fine of Rs. 5,000 should be reduced to Rs. 1,500. The proposal of the Madras Government to amend Section 6 of the Cotton Ginning and Pressing Factories Act, in order to make it obligatory on the part of the owner of a factory to maintain the prescribed scales and weights on the premises and produce them for inspection when called upon to do so, was also approved.

With a view to checking malpractices in ginning and pressing factories and the presence of foreign matter in Indian cotton bales, the various Provinces, which had not amended the Cotton Ginning and Pressing Factories Act, 1925, and the major cotton growing States were again requested to introduce the necessary legislation on the lines of the Bombay and the Central Provinces and Berar Cotton Ginning and Pressing Factories (Amendment) Acts, to provide for the licensing of ginning and pressing factories and the penalization of the presence in cotton bales of cotton seed (in excess of a prescribed percentage), cotton waste and foreign matter. The Baroda State have already passed legislation similar to that in the Bombay Province. In Sind, the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, and the Rules framed thereunder by the Government of Sind, were brought into force during the year. The desirability of including a specific provision in the Act as applied to Sind, against the mixing of cotton waste with cotton was considered, but as the malpractice was reported not to exist at present in the Province, it was decided not to take action until specific complaints were received. In the Punjab and Madras Provinces and in the Mysore, Holkar and Patiala States, the question of introducing legislation is under consideration. In connection with the control of malpractices, such as mixing, watering, etc., in the Punjab, the desirability of providing adequate safeguards against penalizing natural field mixtures of *desi* and American cottons was stressed and it was decided that a recommendation should be made to the Provincial Government to allow a sufficient time lag between the passing of the legislation and its actual application to enable the growers to adjust their practices to the requirements of the Act. In so far as the Provinces of North-West Frontier, Bengal, Assam, Orissa and Ajmer-Merwara are concerned, it was felt that the quantity of cotton production is so small that the need for legislation was not pressing.

A report was received to the effect that, in a certain ginning factory in the Central Provinces and Berar, *bojas* of pressed cotton were rolled on wet

ground for some days, while in another ginning factory in the same province, a bucket of water was poured through a funnel into a *boja* of ginned cotton which was then rolled briskly on the ground. As such practices are not effectively dealt with under the existing provisions of the Cotton Ginning and Pressing Factories Act, as applied to the Central Provinces and Berar, suitable amendment of the Act was suggested.

Under Section 9(1)(b) of the Cotton Ginning and Pressing Factories Act, 1925, approval by the prescribed authority of the plans and specifications for the erection of new ginning factories is necessary, except in the case of factories with not more than four roller gins. It was reported to the Committee that this exemption was being taken advantage of by some gin owners in the Central Provinces and Berar and that, as a result, several four-roller gin factories had been erected in recent years. As, apart from the *kachcha* structure of the building in which ginning in these factories was carried out, there was the possibility of cotton ginned in such factories being mixed with seed in excess of the prescribed percentage, owing to the absence of a separate entrance for *lapas*, the Director of Industries suggested that the proviso in question should be deleted. This suggestion was accepted by the Committee and it was further recommended that, for the sake of conformity, the proviso to Section 9(1A) should also be deleted. The Government of India have accordingly been addressed in the matter.

In the Karnatak, a few cases of admixture of cotton were detected and brought to the notice of the authorities, who warned the persons concerned. In Khandesh, the malpractice of watering is reported to have been completely checked, while mixing cotton waste with good cotton has been appreciably stopped. In Gujerat, the malpractices of watering and mixing of foreign substances are reported to have died out.

In the Central Provinces and Berar, no breaches of the Act were reported during the year.

Under the Central Provinces Cotton Ginning and Pressing Factories (Amendment) Act, 1939, which authorises the fixing of rates chargeable for ginning and pressing cotton and the appointment of rate-fixing committees in specified areas, ten areas were duly notified. The rates fixed were generally considered to have been reasonable, though complaints were received from factory-owners in Khandwa and Ellichpur.

was formerly grown, and, if the extension of this cotton is to be controlled, the Act would require to be so amended as to empower the Provincial Government to prohibit the cultivation and handling of any specified type or types of cotton, the spread of which the Provincial Government may desire to restrict. For this purpose the Provincial Government have drafted a bill to replace the existing Bombay Cotton Control Act. On the other hand, the poor premium received for 1027 A. L. F. during the season has again brought to the fore the controversy regarding the relative merits of 1027 A. L. F. and Selection 1A and the whole question will again be reviewed by the Committee at its cold weather meeting.

(vi) **Central Provinces Cotton Control Act.**—This Act, which was passed into law towards the end of 1936, has for its object the elimination, from the Central Provinces and Berar, of Garrow Hill cotton, a very inferior, coarse, but prolific variety, which threatens to mar the reputation of the Central Provinces cotton and thus to nullify the efforts of the Agricultural Department in the matter of cotton improvement. The Act has been applied for a period of five years to the districts of Nagpur, Wardha, Amraoti, Yeotmal, Buldhana, Akola and Nimar and Sausar *tehsil* of Ohhindwara district. From the beginning of 1939, systematic propaganda has been carried out by the Department against this inferior cotton but during the year it was noticed that the cultivation of Garrow Hill was still carried on in certain areas and propaganda has accordingly been intensified.

(vii) **Baroda Cotton Control Act.**—The Bombay Cotton Control Act of 1935 was, by a notification of the Baroda State, dated the 25th April, 1936, applied to the State with certain modifications to meet its own requirements. The Act has now been replaced by the Baroda Cotton Control Act, 1941, which empowers the Durbar to notify areas for control, to fix the standard variety or varieties to be grown in controlled areas, to prohibit in the controlled area the cultivation of any variety other than the standard variety and the mixing of varieties, possession or use of, or trade in, the prohibited variety or varieties. Rules have been framed under the Act and it has been made applicable to the Navsari district where 1027 A.L.F. has been fixed as the standard variety and the cultivation of any other variety is prohibited.

(viii) **Bhopal Cotton Control Act.**—The Bhopal Cotton Control Act, which was enacted in April 1937, aims at promoting the cultivation of superior

cottons and prohibiting the growing of inferior cottons in the Bhopal State. The State Department of Agriculture is working out a scheme to ensure an adequate supply of pure seed. However, since the preliminary work has not yet been completed, the Act has not come into operation.

(ix) **United Provinces Cotton Pest Control Act.**—This Act has been passed into law and rules have been framed under it. However, the final publication of the rules has been postponed for the time being.

3. RESEARCH STUDENTS.

In the beginning, the Committee undertook to train a body of research workers in the various branches of science pertaining to cotton for employment on its research schemes. Gradually, however, the necessity for this has disappeared and scholarships are now, generally speaking, only awarded when need arises for research workers with specialised training in a particular branch of science to meet the requirements of one or other of the Committee's schemes or for employment in Provincial Agricultural Departments. Fifty-four scholarships and nine training grants have been awarded so far; out of these, one scholarship and six training grants were for studies abroad. Expenditure on research studentships up to the 31st August, 1941, amounted to Rs. 2,80,156.

In view of the paucity of openings for employment of research scholars after completion of their training, and with a view to utilising the facilities available under the Cotton Genetics Research Scheme, Indore, for training in the modern methods of plant breeding and genetics (with special reference to cotton), the application of statistical methods to genetics and plant breeding and the technique of field experiments for varietal and other trials, arrangements have been made to give training on the scheme every year to one or two persons already in service in the Provincial or State Departments of Agriculture or in the Committee's schemes. The normal period for this training is ten months from May to March.

4. COLLECTION AND SUPPLY OF INFORMATION.

As usual, notes on the progress in the introduction of improved varieties of cotton in the Provinces and Indian States and on the work of the Committee were supplied to the East India Cotton Association and the Karachi Cotton Association for publication. The weekly statements of purchases and arrivals of American cotton were published for general information. The

names of pressing factories in Indian States with the requisite details regarding press marks, name of owner or occupier, etc., were communicated to the Director-General of Commercial Intelligence and Statistics, Calcutta, for publication in the Indian Trade Journal and for incorporation in the all-India list of cotton pressing factories published by that Department.

Press notes and leaflets describing the various activities of the Committee and other matters of interest to the cotton industry in general were issued from time to time, during the year.

5. PUBLICATIONS.

Several important scientific and technical journals are received by the Committee, partly by subscription and partly on an exchange basis. These are circulated among its research workers who are thereby enabled to keep in touch with the latest scientific literature which otherwise would not ordinarily be accessible to them.

The Committee desires to express its indebtedness to those institutions which have placed its name on their free mailing lists, in particular to the British Cotton Industry Research Association for its Summary of Current Literature and the Shirley Institute Memoirs, and to the Empire Cotton Growing Corporation, the British Cotton Growing Association, the East India Cotton Association and the Karachi Cotton Association, for the supply of their publications. The Committee also records its thanks to the Indian Trade Commissioner, London, the U.S.A. Department of Agriculture, the U.S.A. Agricultural Experiment Stations, the Lingnan University, Canton, China, the Mitsubishi Economic Research Bureau, Tokio, Japan, the Egyptian Ministry of Agriculture, Technical and Scientific Service, the Liverpool Cotton Association, the Imperial Agricultural Bureau, London, the Imperial Bureau of Plant Genetics, Cambridge, the Manchester Cotton Association, the Textile Institute, Manchester, the Imperial Institute, London, the Indian Statistical Institute, the National Institute of Sciences, Calcutta, the Indian Central Jute Committee and other Associations and Chambers of Commerce for supplying the Committee with their reports, statistics and other valuable literature from time to time.

D. N. MAHTA,

Secretary.

APPENDIX I.

MEMBERS OF THE COMMITTEE.

(1) PRESIDENT—

Mr. P. M. Kharegat, C.I.E., I.C.S., Vice-Chairman, Imperial Council of Agricultural Research, *ex-officio*.

(a) Dr. W. Burns, C.I.E., Agricultural Commissioner with the Government of India, *ex-officio*.

(2) REPRESENTATIVES OF AGRICULTURAL DEPARTMENTS—

Madras	Mr. P. H. Rama Reddi, I.A.S., Director of Agriculture.
Bombay	The Director of Agriculture.
United Provinces	Mr. Vishnu Sahay, I.C.S., Director of Agriculture.
Punjab	Mr. H. R. Stewart, Director of Agriculture.
Central Provinces and Berar	Mr. J. C. McDougall, I.A.S., Director of Agriculture.
Sind	Rao Saheb K. I. Thadani, Director of Agriculture.

(3) THE DIRECTOR GENERAL OF COMMERCIAL INTELLIGENCE AND STATISTICS, *ex-officio*.

(4) REPRESENTATIVES OF CHAMBERS OF COMMERCE AND ASSOCIATIONS—

The East India Cotton Association ..	Sir Purshotamdas Thakurdas, C.I.E. M.B.E.
The Bombay Millowners' Association ..	Sir Sorab Saklatvala, M.L.A.
The Bombay Chamber of Commerce ..	Mr. L. F. H. Goodwin.
The Indian Merchants' Chamber ..	Mr. Chunilal B. Mehta.
The Karachi Chamber of Commerce ..	Mr. A. P. Darlow.
The Ahmedabad Millowners' Association ..	Mr. Chandulal P. Parikh.
The Tuticorin Chamber of Commerce ..	Mr. J. Vonesch.
The Upper India Chamber of Commerce ..	Captain S. R. Pocock, M.C., M.L.A.
The Empire Cotton Growing Corporation ..	Sir William Roberts, C.I.E.

(5) COMMERCIAL REPRESENTATIVES NOMINATED BY CENTRAL GOVERNMENT—

Central Province and Berar	{ Rao Saheb P. V. Deshmukh, Mr. Y. G. Deshpande.
Madras	Mr. J. M. Doak.
Punjab	Kanwar Raj Nath.
Bengal representative	Mr. Suryya Kumar Basu.

(6) CO-OPERATIVE BANKING REPRESENTATIVE—

Sir Chunilal V. Mehta, K.C.S.I., (*Vice-President*).

(8) REPRESENTATIVES OF COTTON GROWING INDUSTRY—

Madras	{ Rao Bahadur R. V. Ramasundaram Pillai, Mr. L. Madhava Reddi.
----------------	--

Bombay	Mr. Yashwantram Rajaram Joshi, Sardar Rao Bahadur Bhimbhai R. Naik.
United Provinces	Khan Bahadur M. Ahmad Hussain Khan, Rai Bahadur Kunwar Laxmi Raj Singh, M.L.C.
Punjab	Sardar Bahadur Gurbachan Singh, M.L.A., Rai Saheb Ch. Surajmal, M.L.A.
Central Provinces and Berar	Rao Bahadur Sir Madhsorao Deshpande, K.B.E., Mr. Suganchand Tapadia.
Sind	Mr. Roger Thomas.

(9) AND (10) REPRESENTATIVES OF INDIAN STATES—

Hyderabad State	Mr. Nizam-ud Din Hyder, Director of Agriculture.
Baroda State	Mr. R. G. Allan, C.I.E., Commissioner of Agriculture.
Gujalior State	Lt. Sardar D. K. Jadhav, Director of Agriculture.
Rajputana and Central India States	Vacant.

(11) ADDITIONAL MEMBERS NOMINATED BY THE GOVERNOR-GENERAL IN COUNCIL :—

1. Rao Bahadur S. S. Salimath, Deputy Director of Agriculture, Southern Division, Dharwar.
2. Mr. T. G. Rama Iyer, Director of Agriculture in Mysore, Bangalore.
3. Rao Bahadur V. Ramanath Ayyar A.V.L., Cotton Specialist, Coimbatore.
4. Musahib-i-Khas Bahadur M. A., Rashidkhan, Home Minister, Holkar State, Representative of the Holkar State.
5. Dr. Chellaram Shewaram, Representative of the Karachi Indian Merchants' Association.
6. Dr. B. L. Sethi, Economic Botanist (Cotton & Rabi Cereals) to the Government of the United Provinces, Cawnpore.
7. The Hon'ble Mr. V. Ramadas Pantulu, President, Madras Provincial Co-operative Bank, Madras.
8. Sir Shri Ram, Representative of the Cotton Millowners of Delhi.
9. Mr. Jivandas Ladhabbhai, Representative of the Karachi Cotton Association, Ltd.
10. Dewan Bahadur Sir T. Vijayaraghavacharya, K.B.E.
11. Dr. P. J. Gregory, Second Economic Botanist, Bengal.
12. Dr. T. E. Gregory, Economic Adviser to the Government of India.
13. Mr. Jamalulla, Deputy Director of Agriculture, Parbhani.

APPENDIX II. **BALANCE SHEET AS AT 31st MARCH, 1941.**

RECEIPTS.		Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.
Cotton Cess Receipts	.. .. .	..	..	..	..	..	..	..	..	..
Less: Refunds of cess to Burma	.. .. .	..	..	..	..	..	..	..	..	..
Interest account:—	.. .. .	..	..	..	..	..	..	..	..	..
Amount received on investments	.. .. .	..	..	..	..	..	..	..	..	..
Add—Refund of income-tax from interest	.. .. .	..	..	..	..	..	..	..	..	..
Less:—	.. .. .	..	..	..	..	..	..	..	..	..
1. Interest paid in advance at the time of purchasing Govt. papers (since recovered)	.. .. .	..	..	..	..	..	..	..	..	..
Interest on temporary overdrafts and bank's commission for collection of interest	.. .. .	..	..	..	..	..	..	..	..	..
2. Interest credited to Provident Fund Account	.. .. .	..	..	..	..	..	..	..	..	..
3. Bank's withdrawal charges	.. .. .	..	..	..	..	..	..	..	..	..
4. Income-tax on interest	.. .. .	..	..	..	..	..	..	..	..	..
5. Brokerage for interest on Govt. papers	.. .. .	..	..	..	..	..	..	..	..	..
6. Provision for securities sold	.. .. .	..	..	..	..	..	..	..	..	..
Profit on conversion and sale of securities	.. .. .	..	..	..	..	..	..	..	..	..
Sinking Fund Account	.. .. .	..	..	..	..	..	..	..	..	..
Miscellaneous Receipts	.. .. .	..	..	..	..	..	..	..	..	..
Refund from Provident Fund for contributions disallowed	.. .. .	..	..	..	..	..	..	..	..	..
Supersede Receipts	.. .. .	..	..	..	..	..	..	..	..	..
Carried over	.. .. .	..	..	..	..	..	..	..	..	..
		1,14,638	13	0	20,12,372	8	5	3,48,982	12	2
		14,001	14	0	14,001	14	0	91,009	14	1
		3,391	1	11	3,391	1	11	492	5	0
		1,63,97,049	11	3	1,63,97,049	11	3			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130	3	8	1,30,20,130	3	8			
		21,05,832	10	2	21,05,832	10	2			
		21,078	12	0	21,078	12	0			
		21,20,911	0	2	21,20,911	0	2			
		42,869	10	0	42,869	10	0			
		1,30,08,508	14	5	1,30,08,508	14	5			
		1,30,20,130								

BALANCE SHEET AS AT 31st MARCH, 1941—(contd.)

114

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..	1,03,07,040 11 3		Brought forward ..	0,52,080 7 10	70,12,755 2 10
			4. Khandesh ..	20,573 5 0	
			5. Co-ordination of Cotton Research ..	1,740 7 0	
			6. Jalgaon Cotton Breeding ..	62,072 2 0	
			7. Breachi Cotton Breeding ..	84,172 11 5	
			8. Small Leaf Disease Survey ..	9,038 0 0	
			9. Survey of Goghari Cotton ..	4,100 5 0	
			10. Deliberation of Cotton Seeds ..	4,878 5 0	
			11. Plant Tullor Propaganda ..	21,478 2 0	
			12. Breeding of Wilt Resistant Cotton for Surat Area ..	0,520 8 3	
			13. Inclination of Northern & Westerns at Rajapur ..	7,135 14 7	
			14. Poona Wilt Breeding ..	32,145 13 0	
			15. Interspecific Hybridization at Surat ..	10,000 15 0	
			16. Dholera Wagon Cotton at V. rangam ..	19,000 7 8	
			Total ..	9,40,558 4 0	
			V. Madras:—		
			1. Hortacum ..	1,42,400 13 1	
			2. Pomphora and Physiological ..	1,86,163 5 4	
			3. Reddor Cholan ..	10,517 0 4	
			4. Breeding of Naden cotton ..	17,217 14 7	
			5. Improvement of Kungari cotton ..	16,928 0 0	
			6. Investigation of the possibilities for control of cotton stem weevil ..	0,230 0 0	
			7. Improvement of Cocanadas ..	5,904 5 0	
			Total ..	2,92,478 5 10	
			VI. Punjab:—		
			(a) Botanical ..	5,80,000 10 0	
			(b) Entomological ..	2,25,008 7 11	
			(c) Wilt Fly ..	48,721 4 1	
			(d) Root Rot ..	66,467 0 10	
			(e) Spraying Trials ..	10,191 13 6	
			(f) Deliberating and Delinting ..	6,112 8 0	
Carried over ..	1,03,07,040 11 3		Carried over ..	0,40,401 6 10	70,12,755 2 10

BALANCE SHEET AS AT 31st MARCH, 1941—(contd.)

115

RECEIPTS.

Brought forward ..

Rs. a. p.

Rs. a. p.

EXPENDITURE.

1,63,97,040 11 3

Rs. a. p.

Rs. a. p.

79,12,765 2 10

(a) Survey of Disease of Malformation ..
 (b) Physiological
 (c) Clean-up Campaign of Spotted Bollworm
 (d) Insect Investigation
 (e) Improvement of Punjab-American

VII. Central Provinces:—

(a) Botanical
 (b) Entomological
 (c) Investigation of Heliothis Obsoleta
 (d) Central Provinces and Berar Cotton Breeding

VIII. United Provinces:—

(a) Pink Bollworm
 (b) Rohilkhand & Bundelkhand Survey
 (c) Botanical

IX. Indore:—

(a) Institute of Plant Industry
 (b) Cotton Genetics Research Scheme

X. Sind:—

(a) Physiological
 (b) Insect Investigation

Carried over

1,63,97,040 11 3

2,63,045 12 10
 7,454 13 1

2,71,400 0 11

79,12,765 2 10

BALANCE SHEET AS AT 31st MARCH, 1941—(contd).

116

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Brought forward ..	1,03,97,049	11 3			Brought forward ..	2,71,490	0 11	70,12,755	2 10
					(a) Black-headed Criket ..	9,245	1 3		
					(d) Scheme for investigation for pro- duction of long staple cottons ..	27,728	13 3		
					(e) Bollworm investigation and Clean-up Scheme ..	0,897	7 0		
					Total ..	3,15,211	15 5		
					XI. <i>Burma</i> :—				
					(a) Capital Expenditure ..	2,900	15 5		
					(b) Cotton Improvement ..	47,780	3 9		
					Total ..	50,007	3 2		
					XII. <i>Tyderabad</i> :—				
					(a) Botanical ..	3,04,975	2 3		
					(b) Cotton Survey ..	30,578	3 0		
					(c) Pink and Spotted Bollworm ..	83,890	10 10		
					(d) Improvement of Kumpta cotton ..	10,043	7 7		
					(e) Inclusion of Northern and Wes- terns in Dry Farming Scheme at Katchur ..	1,543	0 0		
					(f) Pink and Spotted Bollworm Clean-up Campaign ..	53,029	2 0		
					Total ..	5,50,465	0 8		
					XIII. <i>Bikaner</i>	92,012	13 2		
					XIV. <i>Haroda</i> :—				
					(a) Root Rot ..	82,145	0 2		
					(b) Comparative Tests ..	4,251	5 3		
					(c) Survey of Goghari Cotton ..	3,891	14 7		
					(d) Plant Puller Propaganda ..	30,048	0 3		
					(e) Mahilo Cotton at Amrell & Jagudan ..	13,752	0 5		
					Total ..	1,34,089	0 8		
Carried over ..	1,03,97,049	11 3			Carried over ..			70,12,755	2 1

BALANCE SHEET AS AT 31st MARCH, 1941—(concl'd).

RECEIPTS.		EXPENDITURE.	
Rs.	a. p.	Rs.	a. p.
Brought forward ..		1,03,07,040	11 3
GRAND TOTAL ..		1,03,07,040	11 3
		Brought forward ..	
		XV. Rangoal Comilla ..	..
		XVI. Mysore Doddabathi ..	..
		XVII. Collection of Iran Cottons ..	30,613 0 0
		XVIII. Baluchistan—Co-ordination of research on Black-headed Gricket in Sind and Baluchistan ..	13,083 3 0
		XIX. Preliminary Scheme at Navanagar ..	3,121 12 0
		XX. Estimation of effects on cotton crop of the use of Plant Puller ..	1,304 10 0
		Total ..	323 12 4
		MARKETING SCHEMES.	4,143 12 6
		XXI. (a) Punjab Cotton Marketing Survey ..	7,216 1 6
		(b) Farada Better Marketing of 1027 A.L.P. ..	7,408 14 10
		(c) Extension and Marketing of ..	2,91,534 4 7
		(d) Distribution and Marketing of ..	12,161 0 0
		XXII. Miscellaneous Schemes—Completion of Manuial Trials ..	..
		XXIII. Loan Recoverable but considered doubtful—	..
		Indul Co-operative Cotton Sale Society ..	0,353 2 0
		Less—Amount refunded in full ..	0,353 2 0
		By Surplus account ..	..
		By Balance ..	..
		GRAND TOTAL ..	2,533 12 3
			16,91,373 15 3
			1,03,07,019 11 3

04,71,030 14 10

3,18,318 13 11

178 0 0

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1941.

RECEIPTS.

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Opening Balance as on 1st April, 1940 ..	18,97,312 4 4	10,16,487 1 4	19,16,124 0 7	Administration of the Committee. (Including Improvement of Cotton Marketing, Seed Distribution and Extension Schemes, Printing and Propaganda, Statistical Research, and Travelling Allowances of Non-Official Members and Compilation of results of manual trials)..	6,73,500 0 0	2,81,203 0 5
Loans Recoverable	0,353 2 0	802 7 9	0,10,556 0 5	Agricultural Research Grants-in-Aid (Including Marketing Schemes)	3,93,314 1 0	3,77,378 12 8
Sinking Fund	12,821 11 0			Technological Research	25,004 0 0	2,20,036 12 7
Less—Refunds of Suspense Receipts received during 1939-40				Closing Balance :—		
Receipts under Section 12 of the Indian Cotton Cess Act, 1923				(Government Paper at cost)		
Other Receipts :—				Defence Bonds, 1946, of the Face Value of Rs. 6,73,500		
Sale of Publications, Sale of Cotton, Miscellaneous Receipts, Test Fees etc.	18,810 8 9			*3½% Government of India Loan, 1947-50, of the Face Value of Rs. 4,50,000		
Suspense Receipts	492 5 0			4½% Government of India Loan, 1947-50, of the Face Value of Rs. 26,000		
Sinking Fund Provision for 1940-41	1,840 3 0			6% Bombay Municipal Debentures, 1955-60, of the Face Value of Rs. 10,000		
Interest on Investments				6% Rangoon Municipal Debentures, 1954, of the Face Value of Rs. 3,83,500		
Less—Loss on Redemption of 5% Government of India Loan, 1940-49				4% Karachi Port Trust Coupon Debentures, 1955, of the Face Value of Rs. 80,000		
Carried over ..		55,996 4 4		(Market Value on 31st March, 1941, Rs. 17,36,611 5 0).		
				*3½% Government of India Loan, 1947-50, of the Face Value of Rs. 1,50,000 has been deposited with the Imperial Bank of India, Bombay, as Security against any overdraft that may be required by the Committee		
				Fixed Deposit with the Central Bank of India, Ltd.		
				Current Account with the Imperial Bank of India, Bombay		
		25,82,076 14 4			66,000 0 0	
					23,008 6 5	
					18,86,904 9 5	8,88,519 2 8

Carried over ..

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1941—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..			25,82,070 14 4	<p><i>Imprests:—</i></p> <p>Brought forward</p> <p>Committee's Account as certified by the Secretary</p> <p>Technological Research Laboratory as certified by the Director, Technological Research Laboratory</p> <p>Director of Agriculture, Sind, as certified by the Director of Agriculture, Sind</p> <p>Cotton Research Botanist, Lyallpur, as certified by the Cotton Research Botanist, Lyallpur</p> <p>Plant Physiologist, Punjab, as certified by the Plant Physiologist, Punjab</p> <p>Director of Agriculture, Bombay Province as certified by the Director of Agriculture, Bombay Province</p> <p>Suspense (Recoverable)</p>	10,86,004 0 5	8,86,510 2 8
Total ..			25,82,070 14 4	<p>† Total Closing Balance</p> <p>† Includes Rs. 14,001-14-0 on account of Sinking Fund.</p>	10,94,167 11 8	25,82,070 14 4

We have examined the above Statement of Receipts and Payments of the Indian Central Cotton Committee with the Books, Vouchers and certified Returns of the Committee, have obtained all the information and explanations we have required and certify that to the best of our information and explanations received, the above Statement is a correct abstract of the figures appearing in the Books and is drawn up in conformity with the Rules under the Indian Cotton Cess Act, 1923.

DUNDAY, 4th June, 1941.

(Sd.) S. D. BILLIMORIA & Co.,

Registered Accountants, Auditors.

121

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1941.			
Receipts.	Rs.	a.	p.
Opening Balance as on 1st April, 1940 ..	5,01,422	1	2
Less—Payments to subscribers who have resigned in 1938-1940 ..	5,454	13	1
Subscribers' Contributions ..	32,230	1	0
Add—Amount transferred from Indore for the Staff of the Genetics Scheme ..	3,938	0	3
Recoveries against advances ..	7,534	3	0
Less—Refunds to Subscribers who have resigned ..	10,756	10	2
Advances to Subscribers ..	14,387	14	0
Committee's Contributions received from Indian Central Cotton Committee ..	32,236	1	0
Add—Amount transferred from Indore for the Staff of the Genetics Scheme ..	3,895	3	3
Less—Payments made to Subscribers who have resigned, including transfers to Lapses and Forfeitures ..	19,321	3	5
Account for contributions disallowed ..	272	0	8
Interest received on Investments ..	258	5	0
Refund of Income Tax deducted on Interest received during 1939-40 ..			
Carried over ..	19,851	15	1
	5,28,357	2	0
	10,851	15	1
	5,28,357	2	0
	42,708	13	3
	5,39,070	1	4
	4,95,907	4	1
	31,144	8	2
	5,09,531	0	2
	30,121	4	3
	5,44,052	13	5
	10,295	11	5
	5,28,357	2	0
	14,371	3	0
	5,28,357	10	3
	5,28,357	13	3

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1941—continued.

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward.. ..	10,861 15 1	5,28,827 2 0		Brought forward		5,50,043 13 2
Less—Interest paid during the year to subscribers who have resigned :—						
On their own contributions	241 3 0					
On Committee's contributions	230 2 1					
Interest paid in advances at the time of purchase of Government Securities (since realised)	1,373 0 6					
Income Tax deducted from Interest on Investments (recoverable)	1,725 5 7					
Withdrawal Charges for securities redeemed	147 2 0					
Bank's Commission for Collection of Interest and cost of Stamp	47 9 0	3,773 0 1	10,078 0 0			
			108 5 4			
Lapses and Forfeitures Account						
Amount due to Subscribers resigned but remained unpaid during the year :—						
Mr. B. N. Dage		4,415 2 0				
Mr. N. Broodhvas		1,084 10 11				
Total			0,300 12 11	TOTAL		5,50,043 13 3

Examined and found correct.

(Sd.) H. B. BHASKARIA & Co.,
Registered Accountants, Auditors.

BOMBAY, 4th June 1941.

123

[illegible]

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31st MARCH, 1941—(contd.)

MAJOR HEADS.	1	2	3	4	5	Expenditure from Capital Grants on			8	9	10
						Land and buildings.	Machinery, apparatus and other movable property.				
							Rs.	a.				p.
Bombay—contd.											
16. Inter-specific Hybridisation in cotton at Surat.		40,000 0 0	5 0	1-11-1938 ..	10,000 15 0	..	..	4,050 1 11	11,041 13 1	
17. Improvement of Cotton crop in Kaira District.		13,980 0 0	5 0	22-0-1941 ..	..	..	..	..	..
18. Improvement of Dhollera Cotton—Vagad Cotton at Viramgam.		27,110 0 0	5 0	1-5-1937 ..	10,000 7 8	..	..	1,300 0 11	17,030 13 0	
19. Model Project for extension of improvement in cultivation of crops in Surat District.		38,748 0 0	5 0	2-0-1941 ..	..	..	..	..	..
20. Improvement of Dhollera Cotton in Kanad Districts.		2,460 0 0	3 0	..	..	..	..	..	..
Madras:—											
(a) Horbacom		1,47,068 0 0	14 0	1-12-1923 ..	1,42,400 13 1	..	..	4,431 7 0	1,88,035 0 1	Scheme closed down on 31st May 1938.
(b) Pomphores and Physiological.		2,12,770 0 0	11 7½	10-0-1931 ..	1,85,153 5 4	..	..	4,028 2 0	1,80,225 2 7	
(c) Fodder Cholam:—										Scheme closed down on 14th June 1937.	
(i) Capital		000 0 0	0 5	14-1-1931 ..	19,517 0 4	..	881 11 7	..	..
(ii) Recurring		21,010 0 0		14-0-1933 ..	17,217 14 7	..	..	201 3 4	18,344 10 5	
(d) Breeding of Nadam Cotton..		18,203 0 0	8 0	24-5-1937 ..	15,928 0 0	..	..	442 5 0	10,775 0 1	
(e) Improvement of Mungarl Cotton.		23,534 0 0	5 0			..	..	140 1 8	15,778 14 10	

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31ST MARCH, 1941—(contd.)

127

MAJOR HEADS.	Total sanctioned grant.	Period.	Date of starting of the scheme.	Total expenditure up to 31st March, 1941.	Expenditure from Capital Grants on			Expenditure from annual grants on apparatus and equipment of a permanent or semi-permanent nature and live-stock.	Net working expenses, i.e., staff, field experiments, labour, stores, laboratory and field contingencies including petty apparatus.	REMARKS.
					Lands and Buildings.	Machinery, apparatus and other movable property.				
1	2	3	4	5	6	7	8	9	10	
<i>Madras—contd.</i>										
(1) Improvement of Cocanada Cotton.	Rs. a. p. Yrs. Mths.									
	35,809 0 0	5 0	1-2-1940	5,984 5 0	..	..	Rs. a. p.	Rs. a. p.	Rs. a. p.	
(2) Investigation of possibilities of control of Cotton Stem Weevil of South India.	6,200 0 0	1 3	30-10-1939	0,230 0 0	..	..	..	358 15 3	5,605 5 9	
<i>Punjab:—</i>								80 10 0	6,149 12 0	Scheme closed down on 29-1-1941.
(a) Botanical:—								..	..
(i) Capital ..	31,330 0 0	20 7½	13-8-1926	5,38,099 10 9	22,158 0 0	9,102 11 0	..	..	..
(ii) Working Expenses ..	7,98,208 0 0				..	..	..	35,807 3 6	..	
(b) Entomological:—								5,826 3 10	5,21,971 12 3	Rs. 2,030 transferred to Capital.
(i) Capital ..	6,000 0 0	11 11	4-5-1926	2,35,908 7 11	..	..	..	6,367 4 11	2,13,714 15 2	Scheme closed down on 31st March 1938.
(ii) Working Expenses (Plak & Spotted Bell-worm).	2,48,040 0 0				..	..	..	..	..
(c) White Fly ..	50,087 0 0	5 5	1-5-1931	48,721 4 1	..	..	..	6,762 15 0	41,958 5 1	Scheme closed down on 30th Sept. 1936.
(d) Root Rot:—								..	..
(i) Non-recurring ..	3,000 0 0				..	..	..	507 10 6	65,949 15 4	
(ii) Recurring ..	60,120 0 0	0 0	1-9-1932	66,457 9 10	..	..	..	2,372 2 3	7,819 11 3	
(e) Spraying Trials ..	14,400 0 0			10,101 13 0	..	..	..	22,713 14 10	2,46,409 10 3	
(f) Physiological (Cotton Failure Recurrence).	3,77,150 0 0	8 0	8-7-1933	2,89,123 0 1	..	..	..	..	..
			15-3-1935		..	..	..	..	..

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31st MARCH, 1941—(contd.)

MAJOR HEADS.	1	2	3	4	5	Expenditure from Capital Grants on		8	9	10
						Lands and Buildings.	Machinery, apparatus and other movable property.			
		Total sanctioned grant.	Period.	Date of starting of the scheme.	Total expenditure up to 31st March, 1941.	Rs. a. p.	Rs. a. p.	Expenditure from annual grants on apparatus and equipment of a permanent or semi-permanent nature and live-stock.	Net working expenses, i.e., staff, field experiment, stores, laboratory and field continuing potty apparatus.	REMARKS.
	1	Rs. a. p.	Yrs. Mths.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Punjab—contd.										
(a) Clean-up Campaign	..	94,580 0 0	3 5	1-4-1937	59,785 5 3	..	..	19,206 12 2	40,549 0 1	Scheme closed down on 30th April 1940.
(b) Delibration and Delinting—										
(i) Recurring	..	1,900 0 0	2 0	..	0,112 8 0	..	..	17 12 0	222 2 0	
(iii) Non-recurring	..	9,700 0 0				..	5,872 10 0	..	..
(i) Survey of disease of malformation	..	2,074 0 0	0 10	1-6-1934	1,730 10 9	..	..	..	1,730 10 6	Scheme closed down on 31st March 1935.
(j) Cotton Jassid Investigation	..	18,973 0 0	0 0	1-4-1937	11,101 7 9	..	..	345 6 3	10,750 1 3	
(k) Improvement of Punjab-American 2859 cotton.	..	14,000 0 0	5 0	0-7-1938	7,107 5 0	..	..	201 10 3	0,905 10 0	
Central Provinces & Berar:—										
(a) Botanical	..	51,000 0 0	2 0	Oct. 1923	4,03,449 0 4	..	..	0,104 0 10	5,05,042 5 3	The balance of this amounting to Rs. 3,100-13-5 laps- ed on revision.
(b) Cotton Breeding	..	5,36,160 0 0	13 0	1-4-1920	18,357 5 0	..	..	..	..
(c) Entomological	..	98,202 0 0	5 0	1-4-1930	12,344 13 0	..	..	50 10 0	12,285 3 0	Scheme closed down on 30th Sept. 1937.
(d) Investigation of Heliothis Obsolete.	..	13,131 0 0	3 3	2-7-1934	1,908 14 0	..	..	124 8 3	1,574 5 0	
(e) Model Projects for extension of improvements in cultivation of crops.	..	3,000 0 0	1 5	25-9-1939	..	..	..	..	..
		2,208 0 0	3 0	not started	..	..	..	..	..

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31st MARCH, 1941—(contd.)

MAJOR HEADS.	1	Total sanctioned grant.	Period.	Date of starting of the scheme.	Total expenditure up to 31st March, 1941.	Expenditure from Capital Grants on		Expenditure from annual grants on apparatus and equipment of a permanent or semi-permanent nature and live-stock.	Net working expenses, i.e., staff, field experiments, labour, stores, laboratory and field contingencies including petty apparatus.	REMARKS.
						Lands and Buildings.	Machinery, apparatus and other movable property.			
	2	3	4	5	6	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	10
United Provinces—										
(a) Pink Boll-worm:—										
(i) Capital ..	54,000 0 0	8 0	July 1923	} 1,46,646 13 10 {	..	..	49,511 5 6	3,065 4 3	94,070 4 1	Scheme closed down on 31st July 1931. Scheme closed down on 12th July 1934.
(ii) Working Expenses ..	56,000 0 0	7 9½	1-10-1926							
(iii) Recurring grant for staff.	44,476 0 0									
(b) Bollworm and Bundelkhand Cotton Survey.	19,000 0 0	3 8	1-7-1933	18,061 14 4	..	..	..	1,529 12 1	16,532 2 3	Scheme closed down on 1st March 1937.
(c) Botanical ..	91,390 0 0	5 0	22-3-1938	40,137 7 9	..	..	..	7,776 1 0	32,361 6 0	
(d) Model Projects for extension of improvements in cultivation of crops.	3,192 0 0	5 0	not started	..	..	..	..	..	..
Sind:—										
(a) Physiological ..	2,74,346 0 0	11 4	10-7-1927	2,03,945 12 10	..	..	..	17,370 11 9	2,46,575 1 1	Scheme closed down on 30th June 1937.
(b) Jassaid Investigation ..	26,141 0 0	7 0	9-5-1938	7,454 13 1	..	..	..	164 6 0	7,290 7 1	
(c) Investigation into Black-headed cricket.	13,980 0 0	3 0	30-9-1938	9,245 1 3	..	..	..	251 8 6	8,993 8 9	
Scheme for Production of Long Staple Cotton.	2,21,140 0 0	5 0	10-4-1940	27,728 13 3	..	..	..	4,775 3 8	22,953 9 9	
Boll-worm Investigation and Clean-up Campaign.	83,900 0 0	3 0	1-9-1940	6,837 7 0	..	..	..	958 8 6	5,878 14 6	
and Delusition:—										
for rmination scheme for research on Black-headed cricket in Sind and Baluchistan.	37,930 0 0	3 0	1-4-41	..	..	..	..	..	..

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31ST MARCH, 1941—(contd.)

1	2	3	4	5	Expenditure from Capital Grants on		8	9	10
					6.	7.			
MAJOR HEADS.	Total sanctioned grant.	Period.	Date of starting of the scheme.	Total expenditure up to 31st March, 1941.	Lands and Buildings.	Machinery, apparatus and other movable property.	Expenditure from annual grants on apparatus and equipment of a permanent or semi-permanent nature and live-stock.	Net working expenses, i.e., staff, field experiments, labour, stores, laboratory and field contingencies including petty apparatus.	REMARKS.
Bengal:—	Rs. a. p.	Yrs. Mths.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
(a) Comilla Cotton	38,058 0 0	7 4	1-12-1934	30,513 9 9	..	..	1,141 3 9	29,372 6 0	
(b) Cultivation of Long Staple Cotton—Provision for a Supervising officer. ..	8,360 0 0	2 0	1-8-1941	..	..	..	..	..
Baluchistan:—									
Co-ordination of Research Work on Black-headed Cricket in Sind and British Baluchistan.	3,920 0 0	2 0	11-6-1940	1,394 10 0	..	..	..	1,394 10 0	
Burma:—									
(a) Capital	3,000 0 0	..	..	2,908 15 5	..	2,908 15 5	..	..
(b) Cotton Improvement ..	49,082 0 0	6 0	1-4-1931	47,790 3 9	..	..	4,294 5 0	43,555 14 9	Scheme closed down on 31st March 1937.
Inders:—									
(a) Institute of Plant Industry	2,83,535 12 10	Permanent.		19,96,943 12 0	2,12,552 11 5	70,938 1 5	..	..
(b) Capital	16,13,407 15 2	..	Oct. 1924	..	..	..	31,857 4 4	15,31,550 10 10	
(c) Working Expenses ..	71,180 0 0	2 0	1-4-1940	34,614 2 3	..	..	328 6 9	33,785 11 6	
(d) Cotton Genetics Research	2,41,241 0 0	5 0	..	..	..	..	..	..

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31ST MARCH, 1941—(contd.)

133

1	MAJOR HEADS.	2	Period.	4	5	Expenditure from Capital Grants on		8	9	10
						Lands and Buildings.	Machinery, apparatus and other movable property.			
		Rs. a. p.	Yrs. Mths.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
	<i>Madras :-</i>									
	Cotton Marketing Survey in Madras Province.	7,792 0 0	1 4	..	..	..	..	..	..
	<i>Punjab :-</i>									
	Cotton Marketing Survey in the Punjab.	7,694 0 0	1 5	16-9-1938	7,214 1 0	..	..	79 9 0	7,134 8 0	Scheme closed down on 15th Feb. 1940.
	<i>Central Provinces & Berar :-</i>									
	(a) Extension and Marketing of V.434.	2,18,819 0 0 38,725 0 0 71,578 0 0	5 2 1/2 3 0 3 0	1-4-1934	2,91,634 4 7	..	..	..	..
	(b) Verum Cotton	1,17,900 0 0	3 8	1st Sept. 1930	73,544 2 5	..	..	330 0 0	2,91,204 4 7	Committee bears 75% of the cost of staff from 1st March 1939.
	(c) Distribution and Marketing of Buri 107 Cotton in Burhanpur Tehsil.	15,300 0 0 1,316 0 0 10,000 0 0	5 0	March 1939	12,101 9 0	..	..	..	73,544 2 5	Scheme closed down on 30th April 1934.
	<i>Baroda :-</i>									
	(a) Marketing of 1927 A. L. F. Cotton in Baroda State.	12,010 0 0	5 0	1-2-1938	7,408 14 10	..	..	..	7,408 14 10	
	(b) Cotton Marketing Survey in Gujarni, Kathiawar and South Rajputana.	11,108 0 0	1 4	..	..	..	..	..	..

REMARKS.

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31st MARCH, 1941—(contd.)

1	2	3	4	5	Expenditure from Capital Grants on		8	9	10	REMARKS.
					..	Machinery, apparatus and other movable property.				
MAJOR HEADS.	Total sanctioned grant.	Period.	Date of starting of the scheme.	Total expenditure up to 31st March, 1941.	Lands and Buildings.		Expenditure from annual grants on apparatus and equipment of a permanent or semi-permanent nature and live-stock.	Not working expenses, i.e., staff, field experiments, labour, stores, laboratory and field contingencies including petty apparatus.		
	Rs. a. p.	Yrs. Mths.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.		
SEED DISTRIBUTION AND EXTENSION SCHEMES.										
<i>Bombay Province :—</i>										
(i) Irradi	50,110 0 0	0 0	June 1930 ..	44,048 8 3	..	..	5 14 0	44,042 10 3	}	Schemes closed down on the 31st May, 1936.
(ii) Gadag	54,545 0 0	0 0	June 1930 ..	41,700 15 1	..	..	..	41,700 15 1		
(iii) Gadag (Supplementary)	21,448 0 0	4 0	10th June 1931	20,167 11 4	..	..	2,929 5 0	17,238 5 10		Scheme closed down on 10th June, 1936.
(iv) Haveri	27,752 0 0	5 0	..	..	..	..	..	..		Scheme did not start.
(v) Ahmed	40,757 0 0	5 0	5th April 1932	13,080 1 7	..	..	1,722 15 0	10,363 2 1		Scheme closed down on 31st May, 1936.
(vi) Ballhonal	27,425 0 0	5 0	..	..	..	..	..	..		Scheme did not start.
(vii) Surat :—										
(a) 1027 A. L. F. ..	1,18,410 0 0	13 0	1st April 1930	80,842 15 10	..	..	..	80,842 15 10		Committee bears 75% of the cost of staff from 1-4-1939.
(b) Selection 1A ..	7,272 0 0	3 0	1st Feb. 1940	1,632 0 0	..	..	..	1,632 0 0		Receipts amounting to Rs. 1,10,000 participated in the scheme. The grant of Rs. 20,787 for the extended period takes into account anticipated receipts amounting to Rs. 1,000. This scheme closed down on the 30th April, 1937.
(viii) Khandesh (Banalla) ..	2,70,340 0 0	5 0	1st May 1931	1,03,525 14 0	..	..	0,032 14 0	1,54,463 0 0		
	20,787 0 0	1 0								

STATEMENT SHOWING EXPENDITURE ON THE SCHEMES FINANCED BY THE COMMITTEE UP TO 31st MARCH, 1941—(concd.)

MAJOR HEADS.	1	Total sanctioned grant.	Period.	Date of starting of the scheme.	Total expenditure up to 31st March, 1941.	Expenditure from Capital Grants on		Expenditure from annual grants on apparatus and equipment of a permanent or semi-permanent nature and live-stock.	Net working expenses, i.e., staff, field experiments, labour, stores, laboratory and field continuing geneses including petty apparatus.	REMARKS.
						Lands and Buildings.	Machinery, apparatus and other movable property.			
		Rs. a. p.	Yrs. Mths.		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Central Provinces and Berar— Maintenance of nucleus of pure seed of improved strains of Cotton.		7,000 0 0	5 0	April, 1939	2,384 7 0	..	..	10 14 0	2,367 0 0	
		35,400 0 0	0 0	1-3-1930	53,471 0 3	..	..	..	53,471 0 3	G. The amount represents the Committee's share of expenditure which is borne on 50 : 50 basis between the Hyderabad State and the Committee.
		625,789 0 0	4 0		..	..	..	..	..
Baroda :— (i) Navari Seed Storage Scheme.		55,488 0 0	10 0	16th April 1934	20,115 15 7	..	..	440 12 0	10,009 3 7	P. Provisional figures.
	(ii) B. D. 8 ..	17,300 0 0	5 0	1-4-1939	5,002 15 5	..	..	..	5,002 15 5	
	United Provinces—O. 402 ..	45,800 0 0	5 0	1st May 1935	18,616 11 0	..	..	300 0 0	18,316 11 0	Scheme closed down on 15th Feb. 1938.

APPENDIX
RECEIPTS AT MILLS IN INDIA OF RAW
(Compiled from voluntary
1st September, 1940 to
(In thousand bales)*

Trade Descriptions of Cotton.	Bombay Island.	Ahmedabad.	Rest of Bom- bay Province.	Total Bombay Province.	Madras Province.	United Provinces.	C. P. & Berar.	Bengal.	Punjab and Delhi.	Rest of British India.
BENGAL—										
U. P. Deshi	6	5	—	11	—	102	—	17	9	2
Punjab Deshi	20	—	2	31	—	35	—	12	76	7
Sind Deshi	3	2	1	6	—	—	—	—	—	1
Rajputana Deshi	6	3	—	9	—	1	—	—	—	23
Total	44	10	3	57	—	138	—	29	84	33
AMERICANS—										
Sind Sudhar—(280-F-1)	50	28	4	82	0	—	—	—	—	—
Sind—280-F-types (other than 280-F-1)	88	18	3	109	11	—	1	5	—	—
Sind—98	15	3	—	18	8	—	—	—	—	—
Sind—4-F (Ordinary)	37	1	1	39	40	—	—	2	—	—
Punjab—280-F/K.25	21	4	2	27	13	8	—	9	5	1
Punjab—280-F/43	22	4	—	26	1	20	—	8	—	—
Punjab—L. S. S.	9	—	1	10	1	24	1	18	15	2
Punjab—(Unspecified-4-F)	78	3	1	82	16	210	—	37	95	8
Buri	1	—	—	1	1	—	8	3	—	—
Dharwar (Gadag 1)	15	1	10	26	—	—	—	—	—	—
Dharwar (Upland-Unspecified).	6	—	3	9	—	—	—	—	—	—
Cambodia (Co.3 & Co.4)	—	—	—	—	18	—	—	—	—	—
Cambodia (Co.2)	2	1	—	3	139	—	—	—	—	—
Cambodia (Unspecified)	10	1	1	12	69	—	—	5	—	2
Total	354	64	26	444	323	262	10	87	116	13
OOMRAS—										
O. P. and Nimar Oomras	51	3	2	56	10	8	72	6	—	1
Berar Oomras	50	9	5	64	1	4	64	6	—	—
O. P. and Berar Verum	32	7	1	40	3	2	12	9	—	1
Khandesh Oomras	17	8	4	29	1	—	—	—	—	—
Jarila (Khandesh)	46	18	6	70	1	—	2	—	—	—
Khandesh Banilla	2	2	37	41	1	—	—	—	—	—
Barsi-Nagar Oomras	9	—	39	48	—	—	—	—	—	—
Hyderabad Oomras	25	2	26	63	1	2	2	—	—	—
Total	232	49	120	411	18	16	155	21	—	2
HYDERABAD GAORANI	25	1	24	69	17	—	21	—	—	—
CENTRAL INDIA—										
Malvi	16	12	—	28	—	11	1	—	—	2
Central India—Others	27	8	4	39	19	21	—	2	—	—
Total	43	20	4	67	19	22	1	2	—	2
BRACE	132	65	4	202	8	—	—	2	—	—
EWAN	55	53	1	109	1	—	—	—	—	—

* In Indian bales

20/11/40

II.

COTTON CLASSIFIED BY VARIETIES.

(turns furnished by mills.)

31st August, 1941.

of 400 lbs. each.)

Total British India.	Hyderabad.	Mysore.	Baroda.	Gwalior.	Indore.	Kathiawar States.	Other Indian States.	Pondicherry.	Total Indian States.	GRAND TOTAL.	Trade Descriptions of Cotton.
141	—	2	—	13	—	—	3	—	18	159	BENGALS—
160	—	—	—	1	—	—	4	—	5	165	U. P. Deshi.
7	—	—	—	9	—	—	—	—	9	16	Punjab Deshi.
33	—	—	—	1	1	—	8	—	10	43	Sind Deshi.
											Rajputana Deshi.
341	—	2	—	24	1	—	15	—	42	383	Total.
88	—	—	—	—	—	—	2	—	2	90	AMERICANS—
126	—	—	1	—	1	—	—	—	2	128	Sind Sudhar—(289-F-1).
26	—	—	—	—	—	—	2	—	2	28	Sind—289-F-types (other than
81	—	—	1	—	—	—	3	7	11	92	289-F-1).
63	—	—	2	2	1	—	—	—	5	68	Sind—98.
55	—	—	2	—	—	—	1	—	3	58	Sind—4-F (Ordinary).
71	—	—	—	7	—	—	1	—	8	79	Punjab—289-F/K.25.
448	—	—	—	19	—	—	11	3	33	481	Punjab—289-F/43.
13	—	—	—	1	—	—	—	—	1	14	Punjab—L. S. S.
26	—	2	—	—	—	—	—	—	2	28	Punjab (Unspecified-4-F).
9	—	1	—	—	—	—	—	1	2	11	Buri.
18	—	—	—	—	—	—	1	—	1	19	Dharwar (Gadag 1).
142	—	1	—	—	—	—	4	—	5	147	Dharwar (Upland-Unspecified).
88	—	2	1	2	—	—	3	—	8	96	Cambodia (Co.3 & Co.4).
											Cambodia (Co.2).
											Cambodia (Unspecified).
1,254	—	6	7	31	2	—	28	11	85	1,339	Total.
153	—	2	—	1	11	—	12	1	27	180	OOMRAS—
139	—	—	1	1	5	—	2	—	9	148	O. P. and Nimar Oomras.
68	—	—	1	—	3	—	1	—	5	73	Berar Oomras.
30	—	—	4	1	—	—	1	—	6	36	C. P. and Berar Verum.
74	—	—	2	1	1	2	1	—	7	81	Khandesh Oomras.
42	—	—	—	—	—	—	—	1	1	43	Jarila (Khandesh).
48	—	—	—	—	—	—	1	—	1	49	Khandesh Banilla.
69	38	—	—	—	—	—	4	—	42	111	Barsi-Nagar Oomras.
											Hyderabad Oomras.
623	38	2	8	4	20	2	22	2	98	721	Total.
98	37	2	—	—	—	—	—	1	40	138	HYDERABAD GAORANI.
43	—	—	23	36	69	—	16	—	144	187	CENTRAL INDIA—
72	—	—	2	2	71	—	4	—	79	151	Malvi.
											Central India—Others.
115	—	—	25	38	140	—	20	—	223	338	Total.
212	—	—	18	—	3	2	—	—	23	235	BROACH.
157	—	—	16	—	—	13	—	1	30	187	SURTI.

400 lbs. and net weight 392 lbs. of cleaned (lint) cotton.

APPENDIX IV.

EXPORTS BY SEA OF INDIAN RAW COTTON CLASSIFIED BY VARIETIES.

(Compiled from voluntary returns furnished by exporters.)

1st September 1940 to 31st August 1941.

(In thousand bales* of 400 lbs. each.)

Trade Descriptions of Cotton.	Exported to				Total Exports.
	Europe (except United Kingdom and the West.†)	United Kingdom.	Japan.	China and the East (except Japan).	
BENGALS—					
1. U. P. Deshi	—	1	6	1	8
2. Punjab Deshi	29	52	167	11	259
3. Sind Deshi	99	40	1	3	143
4. Rajputana Deshi	—	—	4	—	4
Total ..	128	93	178	15	414
AMERICANS—					
5. Sind Sudhar (289-F-1)	—	4	2	6	12
6. Sind—289-F types (other than 289-F-1) ..	—	33	25	87	145
7. Sind—98	—	7	—	1	8
8. Sind—4-F (Ordinary)	—	15	—	15	30
9. Punjab—289-F/K. 25	—	43	2	12	57
10. Punjab—289-F/43	—	1	—	4	5
11. Punjab—L. S. S.	—	3	19	15	37
12. Punjab—(Unspecified—4-F)	—	104	71	143	318
13. Burl	—	—	—	—	—
14. Dharwar (Gadag 1)	—	—	—	—	—
15. Dharwar (Upland—Unspecified)	—	—	1	4	5
16. Cambodia (Co. 3 & Co. 4)	—	—	—	—	—
17. Cambodia (Co. 2)	—	—	—	1	1
18. Cambodia (Unspecified)	—	—	8	1	9
Total ..	—	210	123	239	627
OMRAS—					
19. O. P. and Nimar Oomras	—	27	29	27	83
20. Berar Oomras	1	7	251	35	294
21. O. P. and Berar Verum	—	—	18	7	25
22. Khandesh Oomras	—	1	123	16	140
23. Jarla (Khandesh)	—	—	3	4	7
24. Khandesh Banilla	—	—	—	—	—
25. Baral-Nagar Oomras	—	2	47	6	55
26. Hyderabad Oomras	—	1	22	7	30
Total ..	1	38	493	102	634
27. HYDERABAD GACRANI	—	—	—	1	1

* Standard Indian bales of approximate average gross weight 400 lbs. and net 382 lbs. of cleaned (lint) cotton.

† Includes U. S. A.

APPENDIX IV—(Contd.)

EXPORTS BY SEA OF INDIAN RAW COTTON CLASSIFIED BY VARIETIES.

(Compiled from voluntary returns furnished by exporters.)

1st September 1940 to 31st August 1941.

(In thousand bales* of 400 lbs. each.)

Trade Descriptions of Cotton.	Exported to				Total Exports.
	Europe (except United Kingdom) and the West.†	United Kingdom.	Japan.	China and the East (except Japan).	
CENTRAL INDIA—					
28. Malvi	—	—	1	—	1
29. Central India—Others	—	—	20	5	25
Total	—	—	21	5	26
30. BROACH	—	5	26	76	107
31. SURTI	—	4	5	15	24
DHOLLERAS—					
32. Gujarat—Dholleras	—	—	3	—	3
33. Gujarat—Short staple	—	—	1	—	1
34. Kathiawar—Dholleras	—	—	3	2	5
35. Kathiawar—Short staple	—	—	5	—	5
36. Cutch—Dholleras	—	—	1	—	1
Total	—	—	13	2	15
SOUTHERNS—					
37. Kumptas (Jayawant)	—	—	1	4	5
38. Kumptas (Unspecified)	—	—	—	4	4
39. Bijapur and Bagalkot Jowari	—	—	2	4	6
40. Madras Westerns—Hagari-1	—	—	1	18	19
41. Madras Westerns—Ordinary	—	—	2	7	9
42. Hyderabad Westerns	—	—	—	3	3
43. White and Red Northerns	—	—	—	—	—
44. Warangal and Cocanadas	—	11	—	—	11
45. Chinnapathi (Short staple)	—	—	—	1	1
Total	—	11	6	41	58
TINNEVELLIES (including Karungannies)—					
46. Tinnevelles	—	1	4	3	8
47. Karungannies	—	—	5	5	10
Total	—	1	9	8	18
48. SALEM	—	—	—	—	—
49. COMILLAS	26	3	—	1	30
50. UNCLASSIFIED	—	—	29	20	49
TOTAL INDIAN COTTON	155	365	908	575	2,003

* Standard Indian bales of approximate average gross weight 400 lbs. and net weight 392 lbs. of cleaned (lint) cotton.

† Includes U. S. A.

STOCKS OF INDIAN RAW COTTON HELD IN INDIA BY THE

(In thousand bales*)

Trade Descriptions of Cotton.	TRADE STOCKS ON 31st AUGUST.					
	Bombay Island.		Karachi.		Rest of India.	
	1940.	1941.	1940.	1941.	1940.	1941.
BENGALS—						
U. P. Deshi	—	—	1	—	(a) 6	(a) 3
Punjab Deshi	—	—	74	73	(b) 3	(b) 12
Sind Deshi	—	—	20	36	—	—
Rajputana Deshi	—	—	—	—	—	—
Unclassified.. ..	22	41	2	—	—	—
Total ..	22	41	97	109	9	15
AMERICANS—						
Sind Sudhar (289-F-1)	8	9	1	5	—	—
Sind-289-F-types (other than 289-F-1)						
Sind—9S	—	—	—	—	—	—
Sind—4-F (Ordinary)	4	1	18	—	—	—
Punjab—289-F/K-25	4	11	9	3	{ (b) 1	(b) 12
Punjab—289-F/43						
Punjab—L. S. S.	8	7	3	3	{ (b) 1	(b) 1
Punjab—(Unspecified-4-F)						
Buri	—	—	91	50	(b) 5	(b) 19
Dharwar (Gadag 1)	—	—	—	—	—	—
Dharwar (Upland-Unspecified).	—	—	—	—	(c) 5	(c) 5
Cambodia (Co. 3 & Co. 4)	—	—	—	—	(d) 11	—
Cambodia (Co. 2)	—	—	—	—	—	—
Cambodia (Unspecified)	—	3	—	—	—	—
Total ..	24	31	122	61	(e) 40	(e) 70
OOMRAS—						
C. P. and Nimar Oomras	41	54	—	—	(f) 25	(f) 34
Berar Oomras	66	92	—	—	(g) 38	(g) 41
C. P. and Berar Verum	—	—	—	—	—	—
Khandesh Oomras	25	87	—	—	(h) 6	(h) 12
Jasira (Khandesh)	—	—	—	—	—	—
Khandesh Banilla	—	—	—	—	—	—
Bari-Nagar Oomras	35	72	—	—	{ (i) 31	(i) 43
Hyderabad Oomras						
Total ..	167	305	—	—	100	130
HYDERABAD GAORANT						
.. ..	1	1	—	—	(i) 4	(i) 4

* Standard Indian bales of approximate average gross weight

N.B.—The detailed statement of mill

(a) At Cawnpore.

(c) At Gadag.

(e) In Madras Province.

(b) In the Punjab.

(d) At Hubli and Gadag.

(f) In Central Provinces and Berar.

V.

MILLS AND THE TRADE ON 31st AUGUST 1940 AND 1941.

of 400 lbs. each.)

Total India.		Mill Stocks on 31st August.		Total Trade and Mill Stocks on 31st August.		Trade Descriptions of Cotton:
1940.	1941.	1940.	1941.	1940.	1941.	
7	3	41	61	48	64	BENGALS—
77	85	27	67	104	152	U. P. Deshi.
20	36	1	2	21	38	Punjab Deshi.
—	—	9	15	9	15	Sind Deshi.
24	41	—	—	24	41	Rajputana Deshi.
						Unclassified.
128	165	78	145	206	310	Total.
9	14	10	18	28	68	AMERICANS—
22	1	24	27	46	28	{ Sind Sudhar (289-F-1).
18	30	56	9	96	99	{ Sind—289-F types (other than 289-F-1).
104	76	22	25	217	214	{ Sind—98.
5	5	1	7	1	7	{ Sind—4-F (Ordinary).
11	—	3	9	8	14	{ Punjab—289-F/K. 25.
—	—	3	5	14	5	{ Punjab—289-F/43.
—	—	—	3	—	3	{ Punjab—L. S. S.
40	73	40	68	40	68	{ Punjab—(Unspecified-4-F).
		18	41	58	114	{ Buri.
209	199	299	421	508	620	{ Dharwar (Gadag 1).
						{ Dharwar (Upland-Unspecified).
						{ Cambodia (Co. 3 & Co. 4).
						{ Cambodia (Co. 2).
						{ Cambodia (Unspecified).
						Total.
66	88	41	77	107	165	OOMRAS—
104	133	22	54	126	187	C. P. and Nimar Oomras.
—	—	27	25	27	25	Berar Oomras.
31	99	11	14	42	113	C. P. and Berar Verum.
—	—	—	19	—	19	Khandesh Oomras.
—	—	8	18	8	18	Jarila (Khandesh).
66	115	12	18	100	178	Khandesh Banilla.
		22	45			{ Barsi-Nagar Oomras.
						{ Hyderabad Oomras.
267	435	143	270	410	705	Total.
5	5	43	60	48	65	HYDERABAD GAORANI.

400 lbs. and net weight 392 lbs. of cleaned (lint) cotton.

stocks on 31st August 1941 is attached.

(g) In Berar.

(h) In East and West Khandesh Districts.

(i) In Hyderabad State.

STOCKS OF INDIAN RAW COTTON HELD IN INDIA BY THE

(In thousand bales*)

Trade Descriptions of Cotton.	TRADE STOCKS ON 31st AUGUST.					
	Bombay Island.		Karachi.		Rest of India.	
	1940.	1941.	1940.	1941.	1940.	1941.
GENERAL INDIA—						
Malvi	—	—	—	—	—	—
Central India—Others	21	45	—	—	(j) 38	(j) 25
Total ..	21	45	—	—	38	25
BERAR	119	72	—	—	(k) 17	(l) 27
SURAT	39	14	—	—	—	—
DHOLLERAS—						
Gujarat—Dholleras	17	25	—	—	(i) 6	(i) 20
Gujarat—Short staple ..						
Kathiawar—Dholleras ..						
Kathiawar—Short staple ..	5	11	—	—	—	—
Cutch—Dholleras	—	—	—	—	—	—
Total ..	22	36	—	—	6	20
SOUTHERN—						
Kumtias (Jayawant)	—	—	—	—	(d) 10	(d) 5
Kumtias (Unspecified) ..	6	32	—	—	(m) 5	(i) 4
Bijapur and Begalhot Jowari ..	9	26	—	—	(n) 67	(n) 27
Madras Westerns (Hagari-I) ..						
Madras Westerns (Ordinary) ..						
Hyderabad Westerns	—	—	—	—	—	—
White and Red Northern ..	—	—	—	—	(c) 21	(o) 28
Warangal and Cocanada ..	—	—	—	—	—	—
Chinnapathi (Short staple) ..	—	—	—	—	—	—
Total ..	15	58	—	—	103	64
TINNEVELLIES (including Karungannies)						
Tinnevelles	—	2	—	—	{(e) 26	{(e) 33
Karungannies						
Total ..	—	2	—	—	26	33
SALING	—	—	—	—	—	—
COCHIN	—	—	—	—	(e) 10	(e) 15
UNCLASSIFIED	6	—	—	—	(k) 8	(k) 4
TOTAL INDIAN COTTON ..	436	605	219	170	384	444

(d) At Hoshi and Gadag.

(e) In Madras Province.

(f) In Hyderabad State.

(j) In Indore and Gwalior States.

(k) In Baroda State.

* Standard Indian bales of approximate average gross weight.

N.B.—The detailed statement of mill stocks.

(l) In Baroda State and at Ahmedabad.

(m) At Gadag and Bailhongal.

V—(contd.)

MILLS AND THE TRADE ON 31st AUGUST 1940 AND 1941.

of 400 lbs. each.)

Total India.		Mill Stocks on 31st August.		Total Trade and Mill Stocks on 31st August.		Trade Descriptions of Cotton.
1940.	1941.	1940.	1941.	1940.	1941.	
—	—	17	53	17	53	CENTRAL INDIA—
59	70	16	47	75	117	Malvi.
						Central India—Others.
59	70	33	100	92	170	Total.
136	99	63	65	199	164	BROACH.
39	14	49	50	88	64	SURAT.
23	45	16	23	54	96	DHOLLERAS—
5	11	6	13	7	20	{ Gujarat—Dholleras.
—	—	9	15	—	—	{ Gujarat—Short staple.
		2	9	—	—	{ Kathiawar—Dholleras.
		—	—	—	—	{ Kathiawar—Short staple.
28	56	33	60	61	116	{ Cutch—Dholleras.
						Total.
10	5	33	45	43	50	SOUTHERNS—
11	36	41	48	52	84	Kumtias (Jayawant).
		9	39			Kumtias (Unspecified).
76	53	39	28	136	188	{ Bijapur and Bagalkot Jowari.
		12	41			{ Madras Westerns (Hagari-1).
21	28	6	12	27	36	{ Madras Westerns (Ordinary).
—	—	—	15	—	—	{ Hyderabad Westerns.
			8			{ White and Red Northern.
			—			{ Warangal and Cocanadas.
118	122	140	236	258	358	{ Chinnapathi (Short staple).
						Total.
26	35	25	29	51	97	TINNEVELLIES (including
—	—	27	33	27	—	Karungannies).
26	35	52	62	78	97	{ Tinnevellies.
						{ Karungannies.
						Total.
10	15	1	6	11	21	SALEMS.
14	4	—	—	14	4	COMILLAS.
						UNCLASSIFIED.
1,039	1,219	934	1,475	1,973	2,694	TOTAL INDIAN COTTON.

400 lbs. and net weight 392 lbs. of cleaned (lint) cotton.
on 31st August 1941 is attached.

(n) In Hyderabad State, Madras Province and at Bijapur.

(o) In Hyderabad State and Madras Province.

STOCKS OF RAW COTTON HELD BY THE

(Compiled from voluntary

(In thousand bales*)

Trade Descriptions of Cotton.	Hombay Island.	Alameda.	Bank of Hombay Province.	Total Hombay Province.	Madrass North.	Madrass South.	Total Madras Province.	United Province.	Coastal Province.	Therav.	Total C. P. & Therav.	Bongal.
BENGAL—												
U. P. Doshi	1	—	—	3	—	—	—	40	—	—	—	—
Punjab Doshi	—	—	1	3	—	—	—	11	—	—	—	—
Sind Doshi	1	—	1	2	—	—	—	—	—	—	—	—
Rajasthan Doshi	—	—	—	—	—	—	—	1	—	—	—	—
Total ..	11	4	2	17	—	—	—	52	—	—	—	—
AMERICA—												
Sind S. 289-F-1)	12	—	—	16	—	—	—	—	—	—	—	—
Sind—289-F types (other than 289-F-1)	18	3	1	22	1	—	5	—	—	—	—	—
Sind—289-F	—	—	—	—	—	—	—	—	—	—	—	—
Sind—289-F (Ordinary)	13	—	—	13	—	—	16	—	—	—	—	—
Punjab—289-F/A/25	—	1	—	10	—	—	—	—	—	—	—	—
Punjab—289-F/23	—	1	—	10	—	—	—	—	—	—	—	—
Punjab—L. S. S.	—	—	—	—	—	—	—	—	—	—	—	—
Punjab—(Unspecified)	15	1	—	16	—	—	—	—	1	—	1	—
Dist.	—	—	—	—	—	—	—	—	—	—	—	—
Dist. (Gadag 1)	—	—	—	—	—	—	—	—	6	—	6	—
Dist. (Upland Unspecified)	—	—	1	3	—	1	—	—	—	—	—	—
Cambodia (Co. 3 & Co. 4)	—	—	—	—	—	3	—	—	—	—	—	—
Cambodia (Co. 2)	1	—	1	2	—	—	—	—	—	—	—	—
Cambodia (Unspecified)	3	1	—	4	1	—	—	—	—	—	—	—
Total ..	94	11	6	111	2	125	128	97	7	—	7	20
OTHERS—												
C. P. and Nizam Omras	13	—	—	17	—	—	—	—	—	—	—	—
Berar Omras	11	3	—	17	—	—	—	—	—	—	—	—
C. P. and Berar Veram	11	1	1	13	—	1	—	—	—	—	—	—
Rhandesh Omras	—	1	—	12	—	1	—	—	—	—	—	—
Farid (Rhandesh)	—	—	—	—	—	1	—	—	—	—	—	—
Rhandesh Benalla	—	5	—	15	—	1	—	—	—	—	—	—
Barr-Nagar Omras	—	1	16	17	—	1	—	—	—	—	—	—
Hydrabad Omras	—	—	16	17	—	—	—	—	—	—	—	—
Total ..	55	12	60	127	1	12	13	4	64	17	81	6
HYDRABAD GACANT	6	—	13	19	8	—	8	—	15	—	15	—
CENTRAL INDIA—												
Malwa	5	—	—	5	—	—	—	—	—	—	—	—
Central India—Others	6	—	—	10	—	—	—	—	—	—	—	—
Total ..	11	4	2	17	—	3	3	16	—	—	—	1

* Standard Indian bales of approximate average gross weight

MILLS IN INDIA ON 31st AUGUST 1941.

returns furnished by mills.)
of 400 lbs. each.)

Punjab & Delhi.	Rest of British India.	Total British India.	Hyderabad.	Mysore.	Baroda.	Gwalior.	Indore.	Kathiawar States.	Other Indian States.	Pondicherry.	Total Indian States.	GRAND TOTAL.	Trade Descriptions of Cotton.
3	1	53	—	1	—	6	—	—	1	—	8	61	BENGALS—
35	7	64	—	—	—	—	—	—	3	—	3	67	U. P. Deshi.
—	—	2	—	—	—	—	—	—	—	—	—	2	Punjab Deshi.
—	8	11	—	—	—	1	1	—	2	—	4	15	Sind Deshi.
													Rajputana Deshi.
38	16	130	—	1	—	7	1	—	6	—	15	145	Total.
—	—	18	—	—	—	—	—	—	—	—	—	18	AMERICANS—
—	—	27	—	—	—	—	—	—	—	—	—	27	Sind Sudhar (289-F-1).
—	—	8	—	—	—	—	—	—	1	—	1	9	Sind—289-F types (other than 289-F-1).
—	—	23	—	—	—	—	—	—	1	3	4	27	Sind—98.
3	—	22	—	1	1	1	—	—	—	—	3	25	Sind—4-F (Ordinary).
1	—	21	—	—	—	—	—	—	—	—	—	21	Punjab—289-F/K.25.
2	1	20	—	—	—	2	—	—	1	—	3	23	Punjab—289-F/43.
23	3	131	—	—	—	5	—	—	2	—	7	138	Punjab—L. S. S.
—	—	7	—	—	—	—	—	—	—	—	—	7	Punjab—(Unspecified-4-F).
—	—	8	—	1	—	—	—	—	—	—	1	9	Buri.
—	—	4	—	—	—	—	—	—	—	1	1	5	Dharwar (Gadag 1).
—	—	3	—	—	—	—	—	—	—	—	—	3	Dharwar (Upland-Unspecified).
—	—	66	—	1	—	—	—	—	1	—	2	68	Cambodia (Co. 3 & Co. 4).
—	1	39	—	1	—	1	—	—	—	—	2	41	Cambodia (Co. 2).
													Cambodia (Unspecified).
29	5	397	—	4	1	9	—	—	6	4	24	421	Total.
—	—	69	—	1	—	—	2	—	4	1	8	77	OOMRAS—
—	—	51	—	—	1	—	1	—	1	—	3	54	C. P. and Nimar Oomras.
—	—	23	—	—	—	—	1	—	1	—	2	25	Berar Oomras.
—	—	13	—	—	1	—	—	—	—	—	1	14	C. P. and Berar Verum.
—	—	18	—	—	—	1	—	—	—	—	1	19	Khandesh Oomras.
—	—	18	—	—	—	—	—	—	—	—	—	18	Jarila (Khandesh).
—	—	17	—	—	—	—	—	—	—	—	—	18	Khandesh Banilla.
—	—	23	21	—	—	—	—	1	—	—	1	18	Barsi-Nagar Oomras.
									1	—	22	45	Hyderabad Oomras.
—	—	232	21	1	2	1	4	1	7	1	38	270	Total.
—	—	42	16	1	—	—	—	—	—	1	18	60	HYDERABAD GAORANI.
—	—	—	—	—	—	—	—	—	—	—	—	—	CENTRAL INDIA—
—	1	14	—	—	5	12	18	—	4	—	39	53	Malvi.
—	—	24	—	—	—	1	20	—	2	—	23	47	Central India—Others.
—	1	38	—	—	5	13	38	—	6	—	62	100	Total.

400 lbs. and net weight 392 lbs. of cleaned (lint) cotton.

STOCKS OF RAW COTTON HELD BY THE

(Compiled from voluntary

(In thousand bales*)

Trade Descriptions of Cotton.	Bombay Island.	Ahmedabad.	Rest of Bombay Province.	Total Bombay Province.	Madras North.	Madras South.	Total Madras Province.	United Provinces.	Central Provinces.	Borar.	Total C. P. & Borar.	Bengal.
BROACH	33	20	1	54	—	3	3	—	—	—	—	—
SURTI	30	11	1	42	—	—	—	—	1	—	1	—
DHOLLERAS—												
Gujarat—Dholleras	1	16	—	17	—	—	—	—	—	—	—	—
Gujarat—Short staple ..	3	9	1	13	—	—	—	—	—	—	—	—
Kathiawar—Dholleras ..	1	6	—	7	—	—	—	—	—	—	—	—
Kathiawar—Short staple ..	3	2	—	5	—	—	—	—	—	—	—	—
Cutch—Dholleras	—	—	—	—	—	—	—	—	—	—	—	—
Total	8	33	1	42	—	—	—	—	—	—	—	—
SOUTHERNS—												
Kumtas (Jayawant)	34	2	4	40	3	—	3	—	—	—	—	—
Kumtas (Unspecified) ..	18	—	7	25	1	—	1	—	—	—	—	—
Bijapur and Bagalkot Jowari.	7	—	27	34	—	1	1	—	—	—	—	—
Madras Westerns (Hagari-1) ..	1	1	1	3	13	3	16	—	—	—	—	1
Madras Westerns (Ordinary) ..	8	3	2	13	4	8	12	1	—	—	—	5
Hyderabad Westerns	—	1	5	6	—	1	1	—	—	—	—	—
White and Red Northern ..	—	1	1	2	10	1	11	—	—	—	—	—
Warangal and Cocanadas ..	—	—	—	—	2	1	3	—	—	—	—	1
Chinnapathi (Short staple) ..	—	—	—	—	—	—	—	—	—	—	—	—
Total	68	8	47	123	33	15	48	1	—	—	—	7
TINNEVELLIES (including Karungannies)—												
Tinnevellies	2	—	—	2	—	27	27	—	—	—	—	—
Karungannies	—	—	—	—	—	31	31	—	—	—	—	1
Total	2	—	—	2	—	58	58	—	—	—	—	1
SALEMS												
COMILLAS	1	—	—	1	—	5	5	—	—	—	—	—
Total Indian Cotton ..	320	103	133	556	44	222	266	170	87	17	104	42
AMERICANS	10	—	1	11	—	1	1	—	—	—	—	1
EGYPTIANS	9	38	4	51	1	8	9	—	1	—	1	2
EAST AFRICANS	30	20	7	66	—	2	2	—	2	—	2	3
OTHERS (Sudan, Burma, etc.) ..	47	9	3	59	1	8	9	—	4	—	4	—
Total Foreign Cotton ..	96	76	15	187	2	10	21	—	7	—	7	6
GRAND TOTAL	416	179	148	743	46	241	287	170	94	17	111	48

*Standard Indian bales of approximate average gross weight

MILLS IN INDIA ON 31st AUGUST 1941. *returns furnished by mills.)* *of 400 lbs. each.)*

151

Punjab & Delhi.	Rest of British India.	Total British India.	Hyderabad.	Mysore.	Baroda.	Gwalior.	Indore.	Kathiawar States.	Other Indian States.	Pondicherry.	Total Indian States.	GRAND TOTAL.	Trade Descriptions of Cotton.
—	—	57	—	—	7	—	—	1	—	—	8	65	BROACH.
—	—	43	—	—	2	—	1	4	—	—	7	50	SURTI.
—	1	18	—	—	—	—	—	3	—	—	5	23	DHOLLERAS—
—	—	13	—	—	—	—	—	—	—	—	8	13	Gujarat—Dholleras.
—	—	7	—	—	—	—	—	—	—	—	4	15	Gujarat—Short staple.
—	—	5	—	—	—	—	—	—	—	—	—	9	Kathiawar—Dholleras.
—	—	—	—	—	—	—	—	—	—	—	—	—	Kathiawar—Short staple.
—	—	—	—	—	—	—	—	—	—	—	—	—	Cutch—Dholleras.
—	—	—	—	—	—	—	—	—	—	—	—	—	Total.
—	—	—	—	—	—	—	—	—	—	—	—	—	SOUTHERNS—
—	—	—	—	—	—	—	—	—	—	—	—	—	Kumtias (Jayawant).
—	—	—	—	—	—	—	—	—	—	—	—	—	Kumtias (Unspecified).
—	—	—	—	—	—	—	—	—	—	—	—	—	Bijapur and Bagalkot Jowari.
—	—	—	—	—	—	—	—	—	—	—	—	—	Madras Westerns (Hagari-1).
—	—	—	—	—	—	—	—	—	—	—	—	—	Madras Westerns (Ordinary).
—	—	—	—	—	—	—	—	—	—	—	—	—	Hyderabad Westerns.
—	—	—	—	—	—	—	—	—	—	—	—	—	White and Red Northern.
—	—	—	—	—	—	—	—	—	—	—	—	—	Warangal and Cocanadas.
—	—	—	—	—	—	—	—	—	—	—	—	—	Chinnapathi (Short staple).
—	—	—	—	—	—	—	—	—	—	—	—	—	Total.
—	—	—	—	—	—	—	—	—	—	—	—	—	TINNEVELLIES (including Karungannies)—
—	—	—	—	—	—	—	—	—	—	—	—	—	Tinnevollies.
—	—	—	—	—	—	—	—	—	—	—	—	—	Karungannies.
—	—	—	—	—	—	—	—	—	—	—	—	—	Total.
—	—	—	—	—	—	—	—	—	—	—	—	—	SALEMS.
—	—	—	—	—	—	—	—	—	—	—	—	—	COMILLAS.
—	—	—	—	—	—	—	—	—	—	—	—	—	Total Indian Cotton.
—	—	—	—	—	—	—	—	—	—	—	—	—	AMERICANS.
—	—	—	—	—	—	—	—	—	—	—	—	—	EGYPTIANS.
—	—	—	—	—	—	—	—	—	—	—	—	—	EAST AFRICIANS.
—	—	—	—	—	—	—	—	—	—	—	—	—	OTHERS (Sudan, Burma, etc.).
—	—	—	—	—	—	—	—	—	—	—	—	—	Total Foreign Cotton.
—	—	—	—	—	—	—	—	—	—	—	—	—	GRAND TOTAL.

400 lbs. and net weight 392 lbs. of cleaned (lint) cotton.

STOCKS OF INDIAN COTTON ON 31ST JANUARY 1941 HELD BY THE MILLS AND
THE TRADE IN MADRAS PROVINCE.
(In thousand bales of 400 lbs. each.)

Trade Descriptions of Cotton.	MILL STOCKS ON 31st JANUARY.					TRADE STOCKS ON 31st JANUARY.					TOTAL STOCKS ON 31st JANUARY.				
	1937.	1938.	1939.	1940.	1941.	1937.	1938.	1939.	1940.	1941.	1937.	1938.	1939.	1940.	1941.
Tinnevelly ..	28	22	32	20	18	4	18	4	2	14	32	40	36	22	32
Salern ..	8	15	16	4	9	2	3	8	3	2	10	18	24	7	11
Cambodias ..	47	46	71	33	34	11	14	17	5	21	58	60	88	38	55
Northern & Westerns	22	24	19	15	23	11	12	18	2	16	33	36	37	17	39
Cocanadas ..	*	*	1	1	1	10	12	14	8	9	10	12	15	9	10
Outside Cottons ..	34	50	27	40	56	..	..	..	..	..	34	50	27	49	56
Total ..	139	157	166	122	141	38	59	61	20	62	177	216	227	142	203

* Less than 500 bales.

APPENDIX VI.

INDIAN RAW COTTON CONSUMED IN INDIAN MILLS.

(Based on returns made under the Indian Cotton Cess Act, 1923, by mills in British India, and on voluntary returns from mills in Indian States).

Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

	1920-27.	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.	1938-39.	1939-40.	1940-41.
Bombay Island ..	747,988	435,420	542,030	700,375	604,540	611,000	505,084	401,709	687,287	604,190	630,720	732,815	750,317	834,149	982,084
Ahmedabad ..	204,139	208,075	318,938	344,021	321,503	322,257	348,000	373,315	320,558	320,082	304,308	346,209	346,375	305,450	341,800
Bombay Province ..	1,107,892	894,071	1,044,025	1,300,859	1,173,050	1,132,645	1,116,207	1,063,540	1,230,010	1,180,310	1,128,744	1,353,008	1,316,318	1,172,285	1,580,079
Madras Province ..	185,207	104,581	204,284	211,488	214,750	200,707	202,013	278,060	312,164	365,423	412,208	422,573	480,839	507,391	525,011
United Provinces ..	204,702	170,840	182,402	234,205	235,023	250,820	273,573	277,230	202,424	317,011	200,073	288,320	350,331	340,340	381,025
Central Provinces and Berar ..	111,292	110,888	121,301	123,146	118,402	115,018	111,208	112,000	125,014	130,208	122,087	140,587	104,010	142,868	153,825
Bengal ..	80,763	82,080	84,212	90,075	91,093	102,300	103,784	107,633	101,101	98,802	70,044	92,540	90,011	111,383	135,227
The Punjab and Delhi.	40,687	45,688	54,575	64,404	73,730	80,081	80,854	71,030	83,807	80,430	93,880	94,742	133,347	105,274	171,652
Rest of British India	13,190	15,040	22,189	24,458	27,101	30,342	31,035	35,130	38,575	38,010	35,823	40,840	40,800	44,867	47,316
Total—British India..	1,812,733	1,519,760	1,714,038	2,051,605	1,935,393	1,987,003	2,009,004	1,940,210	2,183,701	2,228,374	2,172,725	2,445,000	2,501,803	2,493,408	2,994,795
Total—Indian States*	229,443	251,589	277,540	315,399	333,906	358,793	351,200	300,110	428,341	440,314	400,000	554,003	559,202	550,098	622,412
TOTAL—INDIA ..	2,042,170	1,771,349	1,991,578	2,373,094	2,269,359	2,345,896	2,360,204	2,240,320	2,612,132	2,677,688	2,632,785	2,999,009	3,151,005	3,050,106	3,617,147

* Figures for Indian States up to and including 1930-31, being based on yarn production returns, include foreign cotton also.

† From April 1937 figures for Burma have been excluded.

INDIAN RAW COTTON CONSUMED IN MILLS IN INDIAN STATES.

(Based on voluntary returns from mills in Indian States).

N.B.—Figures up to and including 1930-31, being based on yarn production, include foreign cotton also.
Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

	1928-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41.
Hyderabad ..	15,210	10,007	10,067	20,823	23,074	31,290	33,488	33,231	45,588	51,771	40,081	03,003	98,159	67,006	72,800
Mysore ..	43,571	43,290	30,010	46,599	43,290	40,293	50,500	47,108	51,109	50,854	53,230	56,244	53,858	67,851	66,092
Baroda ..	40,070	40,181	48,362	50,043	45,207	55,534	50,587	53,012	57,140	51,063	51,761	70,980	73,978	86,573	91,510
Awalora ..	24,257	25,710	30,708	41,403	45,207	45,592	43,300	49,302	50,318	72,100	70,070	86,243	94,000	120,189	138,785
Indore ..	53,620	53,301	70,070	83,020	88,020	05,200	01,030	111,430	114,220	133,307	100,454	147,703	140,702	43,703	50,470
Kathinwar States ..	40,809	52,581	57,224	04,454	20,283	18,340	18,868	20,506	35,438	37,307	42,717	48,545	44,104	192,792	108,180
Other Indian States ..	250,443	251,589	277,540	315,300	333,009	358,793	351,260	390,119	423,341	440,314	400,900	554,063	559,292	556,998	622,412
Total—Indian States	250,443	251,589	277,540	315,300	333,009	358,793	351,260	390,119	423,341	440,314	400,900	554,063	559,292	556,998	622,412

LOOSE (UNPRESSED) INDIAN RAW COTTON RECEIVED IN SPINNING MILLS IN BRITISH INDIA.

(Based on voluntary returns furnished by mills.)

Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

	1928-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41.
Bombay Province ..	28,328	24,070	27,324	24,391	54,400	74,970	80,092	74,808	58,355	75,617	97,210	74,750	80,164	88,687	96,215
Madras Province ..	25,108	30,500	52,188	40,582	55,717	09,380	90,340	110,875	123,260	147,044	173,102	156,675	192,480	170,540	180,257
United Provinces and Central Provinces ..	10,091	10,308	13,878	20,441	18,466	14,367	19,239	17,871	10,000	10,405	10,650	15,710	17,532	20,270	20,127
Bihar ..	40,792	20,801	0,924	10,243	15,771	20,743	17,402	18,382	20,544	27,502	20,321	32,860	26,980	29,052	32,580
Bengal ..	3,010	4,750	3,700	4,301	4,307	2,317	2,140	..	5,535	3,110	28,385	23,873	25,060	33,079	28,627
The Punjab and Delhi ..	..	..	..	..	..	..	..	..	..	..	19,282	17,160	22,016	12,734	16,620
Rest of British India ..	126,180	100,488	104,074	111,088	146,700	211,705	215,270	221,900	217,784	283,978	325,068	321,037	336,941	357,374	391,344
Total—British India	..	..	..	..	..	..	..	..	..	..	450,207	430,040	458,110	474,336	523,001
Total—INDIA*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* Figures up to 1935-36 not compiled.

† Figures up to 1935-36 exclude Delhi.
‡ From 1938-37 the figures refer to consumption and not receipts and are based on returns furnished under the Indian Cotton Cess Act, 1923, by mills in British India and on voluntary returns from mills in Indian States. From April 1937 figures for Burma have been excluded.

APPENDIX VII.

Revised Trade Classification of Indian Cottons.

Trade Descriptions.

Tracts included.

I. BENGALS.—

- | | |
|----------------------|---|
| (1) U. P. Deshi | United Provinces (including Rampur Stato), Delhi, Bihar, Orissa [excluding tho districts of (i) Koraput and (ii) Ganjam (other than the Khondmals)], Bundolkhand Agency of Central India, Rowa State of Central India Residency (Indoro), and Western Bengal (Bankura and Midnapore districts). |
| (2) Punjab Deshi | Punjab (including Indian States, oxecept Khairpur State) and North-West Frontier Province. |
| (3) Sind Deshi | Sind (including Khairpur Stato). |
| (4) Rajputana Deshi. | Ajmer Merwara and Rajputana States (excluding Jhalawar and Partabgarh States and Sironj, Chhabra and Pirawa parganas of Tonk State). |

II. AMERICANS.—

- | | |
|----------------------|---|
| (1) Sind-American | Sind (including Khairpur Stato). |
| (2) Punjab-American. | Punjab (including Indian States, except Khairpur Stato). |
| (3) Buri | Burhanpur <i>tahsil</i> of Nimar district of Central Provinces. |

III. OOMRAS.—

- | | |
|---------------------------|---|
| (1) C.P. Oomras | Central Provinces (excluding Nimar district); and Yeotmal district of Berar. |
| (2) Berar Oomras | Berar (excluding Yeotmal district). |
| (3) Nimar Oomras | Nimar district of Central Provinces. |
| (4) C.P. and Bérar Verum. | Central Provinces and Berar. |
| (5) Khandesh Oomras. | Nasik, East Khandesh (excluding Amalner taluka) and West Khandesh (excluding Nawapur and Shirpur talukas) districts of Bombay Province. |
| (6) Khandesh Banilla. | Amalner taluka of East Khandesh district and Shirpur taluka of West Khandesh district of Bombay Province. |
| (7) Barsi-Nagar Oomras. | Ahmednagar, Poona and Sholapur districts of Bombay Province and Akalkot State. |

Trade Descriptions.

Tracts included.

III. OOMRAS—(contd.).

(8) Hyderabad
Oomras.

Aurangabad, Bir (excluding Mominabad taluka), Parbhani, Adilabad (excluding Nirmal taluka), Osmanabad (excluding the protected tract included under "Hyderabad-Gaorani") and Nizamabad districts of Hyderabad State.

IV. HYDERABAD-
GAORANI.

The Hyderabad-Gaorani Protected Area of Hyderabad State comprising: the districts of Nander and Bidar, part of Osmanabad district, Nirmal taluka of Adilabad district and Mominabad taluka of Bir district.

V. CENTRAL INDIA—

(1) Malvi

(2) Central India
—Others.

Gwalior State, Indore State, Bhopal Agency and Malwa Agency of Central India; Jhalawar and Partabgarh States and Sironj, Chhabra and Pirawa parganas of Tonk State of Rajputana.

VI. BROACH

Kaira district and Broach and Panch Mahals district (excluding Ankleshwar taluka) of Bombay Province, certain States* in the Gujarat States Agency and Baroda district of Baroda State.

VII. SURAT

Ankleshwar taluka of Broach and Panch Mahals district, Surat district and Nawapur taluka of West Khandesh district of Bombay Province, Rajpipla, Sachin, Bansda and Dharampur States of the Gujarat States Agency and Navsari district of Baroda State.

VIII. DHOLLERAS—

(1) Gujerat—
Dholleras.

"Wagad," "Lalio" and other staple cottons grown in Ahmedabad district of Bombay Province, Mehsana district of Baroda State and in part of Western India States Agency.

(2) Gujerat—
Short-staple.

Short-staple cottons grown in part of Western India States Agency.

(3) Kathiawar—
Dholleras.

"Wagad," "Kala" and other staple cottons grown in part of Western India States Agency.

* Including Balasinor, Baria, Cambay, Chota Udepur, Lunawada, Sant, Jambugoda, Kadana, Mandwa, Vajiria and Bhaderwa.

Trade Descriptions.

Tracts included.

VIII. Dholleras—(contd).

- (4) Kathiawar— "Mathia" and other short-staple cottons grown in part
Short-staple. of Western India States Agency and in Amreli district
of Baroda State.
- (5) Cutch Cutch State.
Dholleras.

IX. SOUTHERNS—

- (1) Kumpta and Dharwar, Belgaum and Satara districts of Bombay
Upland. Province; Satara Jagirs; S. M. C. States; Mysore
State (excluding Mysore and Bangalore districts);
and Raichur Protected Area in Raichur district of
Hyderabad State.
- (2) Bijapur and Bijapur district of Bombay Province.
Bagalkot Jowari.
- (3) Westerns Bellary, Anantapur and Cuddapah districts and Patti-
konda taluka of Kurnool district of Madras Province;
Raichur district (excluding the Raichur Protected
Area) and Gulbarga district of Hyderabad State.
- (4) White and Red Kurnool district (excluding Pattikonda taluka but in-
Northerns. cluding Banganapalle State) of Madras Province.
- (5) Warangal and Nellore, Guntur, Kistna, East Godavari and West Go-
Cocanadas. davari districts and Golconda taluka of Vizagapa-
tam district of Madras Province; Warangal, Karim-
nagar, Nalgonda, Mahboobnagar, Atrabialda and Me-
dak districts of Hyderabad State.
- (6) Chinnapathi Ganjam (excluding the Khondmals) and Koraput
(Short-staple). districts of Orissa; and Vizagapatam (excluding Gol-
conda taluka) district of Madras Province.

X. TINNEVELLIES—

- (including Karun- Coimbatore, Madura, Ramnad and Tinnevely districts
gannies). of Madras Province.

XI. CAMBODIAS

- .. North Arcot, South Arcot, Coimbatore, Salem, Trichi-
nopoly (including Pudukkottai State), Madura, Ram-
nad, Tinnevely, Chittoor and Chingleput districts of
Madras Province.

XII. SALEMS

- .. South Arcot, Coimbatore, Salem, Trichinopoly, Tanjore,
Malabar and South Kanara districts of Madras Pro-
vince; and Mysore district of Mysore State.

XIII. COMILLAS

- .. Assam; and Eastern Bengal (Mymensingh and Chitta-
gong Hill Tracts districts and Tripura State).

APPENDIX VIII.

**Sind Cotton Ginning & Pressing Factories Rules, 1941, under the Cotton
Ginning & Pressing Factories (Bombay Amendment) Act, 1936.**

REVENUE DEPARTMENT,

Sind Secretariat,

Karachi, 18th April, 1941.

No. 1936-95-83-I (a)/E. In exercise of the powers conferred by Section (2) of Section 1 of the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, IV of 1936, His Excellency the Governor of Sind is pleased to direct that the provisions of the said Act shall apply to the whole of the Province of Sind with effect from the date of this notification.

By order of His Excellency the Governor,

(Sd.) B. R. PATEL,

Deputy Secretary to Government.

NOTIFICATION FOR THE SIND GOVERNMENT GAZETTE

REVENUE DEPARTMENT,

Sind Secretariat,

Karachi, 18th April, 1941.

No. 1936-95-83-I (a)/E. In exercise of the powers conferred by section 13 of the Cotton Ginning and Pressing Factories Act, 1925 (XII of 1925), as amended by the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, IV of 1936, His Excellency the Governor of Sind is pleased to substitute the following rules for those published under notification No. Rev: 1308, dated the 2nd March 1938 :

1. *Short title and commencement.*—(1) These rules may be called the Cotton Ginning and Pressing Factories Rules, 1941.

(2) They shall come into force from such date as the Provincial Government may, by a notification in the Official Gazette, appoint in this behalf.

2. *Definitions.*—In these rules, unless there is anything repugnant in the subject or context :—

(1) "Act" means the Cotton Ginning and Pressing Factories Act, 1925, as amended by Bombay Act IV of 1936.

(2) "Section" means a section of the Act ;

(3) "Factory" means a cotton ginning factory or a cotton pressing factory as defined in the Act;

(4) "Director" means the Director of Agriculture, Sind.

3. *Admixture of cotton.*—(1) The mixture prescribed for the purposes of section 2 (aa) shall be a mixture of deshi with American or Egyptian varieties of cotton as determined by seed weight and not seed counts during the process of ginning, in which the percentage of the deshi cotton exceeds ten.

Explanation.—An average sample shall consist of a mixture of approximately equal quantities of seed taken from the outturn of each gin in the process of ginning at the time of inspection. A sample of the mixture shall weigh not less than 10 lbs. and shall be divided into two equal parts each of which shall be securely packed in the presence of the gazetted officer concerned and of the factory manager. One of the seed packages shall be retained by the factory manager and the other package sent to the Director of Agriculture for necessary action. For the purposes of analysis, deshi seed should be separated from not less than 1 lb. of the mixture.

(2) Notwithstanding anything herein contained, the Provincial Government may, for such period as it may prescribe exempt any local area from the operation of this rule.

4. *Season.*—The season shall be the period between 1st September of one year and 31st August of the next year.

5. *Application for licence.*—(1) An application for a licence under the Act may be made by the owner of the factory to the Collector within the local limits of whose jurisdiction such factory is situate.

(2) The fee prescribed for any such licence shall be Rs. 10/- per season for any cotton ginning factory or cotton pressing factory or both, if located in the same premises.

(3) Every application for a licence shall be supported by a Treasury Receipt showing the payment of the prescribed amount in the Treasury.

(4) Subject to the restrictions imposed by or under the Act, or the Rules, a licence shall be issued on such application in Form A.

6. *Particulars of cotton ginning factories.*—The particulars of a cotton ginning factory prescribed under sub-section (2) of section 3 shall include the name of the factory, its situation and the name of the owner or lessee.

7. *The proportion of seed.*—The proportion of seed in cotton bales prescribed under sub-section (2) of section 3-A, shall not exceed one per centum.

8. *Authority competent to give a certificate of moisture.*—(1) The Director of Agriculture shall be the authority competent to give a certificate as to the normal quantity

of moisture that a given quantity of ginned cotton should have, as also the quantity of moisture it possesses, provided that he shall make allowance for the absorption by natural causes both before and after the cotton leaves the factory.

(2) Such certificates may be based on (a) the analysis of the cotton carried out, at the discretion of the Director, at the Agricultural Research Station at Sakrand or at any other station or farm of the Agricultural Department, or (b) the report of two persons selected for the occasion, either one each by the Boards of Directors of the Karachi Cotton Association Limited and the Indian Merchants' Association or both from one of the two Associations, at the request of the Director of Agriculture.

9. *Complaint of offences.*—(1) Any person interested may make a complaint that there has been a contravention of the provisions of section 3-A in respect of any cotton, package or bale.

(2) Such complaints other than those made by a gazetted officer of the status prescribed in sub-para (4) of this rule, shall be made in writing to the Director and shall be accompanied by a sealed sample of the cotton or cotton seed complained of ;

Provided that no such complaint shall be entertained unless a fee of Rs. 10 for each bale or package of cotton or part thereof or for each package of cotton or part thereof or for each package or sample of cotton seed with a minimum fee of Rs. 100 is paid at the time of making a complaint.

(3) The Director on receipt of such complaint shall cause the cotton, package or bale or the cotton seed in respect of which the complaint has been made to be seized and sealed and shall forward the same for examination and report to the authority prescribed under these rules.

(4) The officer appointed in accordance with section 3-B and 3-C of the Act shall be a gazetted officer not below the rank of a Cotton Superintendent.

10. *Authority competent to examine cotton, etc.*—The authority competent to examine such cotton shall be—

- (a) The Director of Agriculture, or
- (b) the Chairman, Sind Cotton Committee, or
- (c) any two persons selected either one each by the Board of Directors of the Karachi Cotton Association and the Indian Merchants' Association or both by one of the two Associations at the request of the Director of Agriculture or the Chairman, Sind Cotton Committee, from the panel of arbitrators elected under the rules, from time to time being in force of the said Associations.

11. *Sealing of cotton seized.*—The cotton, package or bale or the cotton seed shall be re-sealed in the manner prescribed in these rules after the examination referred to in rule 10.

12. *Manner of sealing.*—All things seized and required to be sealed under this Act shall be sealed with the official seal of the officer sealing the same and if the owner or the person in charge of the factory so desires, also with the seal, if any, which he may provide for this purpose.

13. *Compilation and publication of returns.*—The statements referred to in sub-sections (1) and (3) of Section 5 of the Act shall be furnished to the Director of Agriculture by the owner of every cotton ginning factory and of every cotton pressing factory in forms B and C, respectively, while those referred to in sub-sections (2) and (4) shall be compiled by the Director in forms D and E. The latter statements shall be published monthly and weekly respectively in the Official Gazette and copies thereof furnished to the Director General of Commercial Intelligence and Statistics, Calcutta, and to the Secretary, Indian Central Cotton Committee, Bombay.

By order of His Excellency the Governor,

(Sd.) B. R. PATEL,

Deputy Secretary to Government.

FORM A.

LICENCE.

(Rule 5).

- (1) Name of Factory
- (2) Description of the place
where it is situated.
- (3) Name, description and
place of residence of the
owner of the Factory.

CONDITIONS.

This licence is granted subject to all the provisions of the Cotton Ginning and Pressing Factories Act (XII of 1925), Bombay Amendment Act, IV of 1936, and the rules made thereunder.

FORM B.

GINNING RETURN.

District _____ Number of Ginning Factory _____

(Return under sub-section (1) of Section 5 of the Cotton Ginning and Pressing Factories Act, 1925, as amended by Bombay Act IV of 1936).

Return showing Quantity of cotton ginned for the month ending _____ 19 .

Name of Ginning Factory with correct Postal Address _____

Name of owner or of registered lessee (if any) _____

Quantity (by weight) of cotton ginned during the month.	Quantity (by weight) of cotton ginned since the commencement of the season (i. e., since 1st September 19) to the end of the month.	REMARKS.
Bojas of 392 lbs. each.	Bojas of 392 lbs. each.	

Dated _____ 19 .

Signature of Owner or Person in charge.

FORM C.

PRESSING RETURN.

District _____

Number of Pressing Factory _____

(Return under sub-section (3) of Section 5 of the Cotton Ginning and Pressing Factories Act, 1925, as amended by Bombay Act IV of 1936).

Return showing quantity of cotton pressed for the week ending _____ 19 .

Name of Pressing Factory with correct Postal Address _____

Name of Owner or of registered lessee (if any) _____

Quantity (by bales) of cotton pressed during the week.	Quantity (by bales) of cotton pressed since the commencement of the season (i. e., since 1st September 19) to the end of the week.	REMARKS.

Dated _____ 19 .

Signature of Owner or Person in charge.

**LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—*contd.***

TECHNOLOGICAL LABORATORY, BOMBAY—(*contd.*)

23.	Junior Tester	Mr. K. V. N. Nayar.
24.	Junior Tester	Mr. V. N. Modak, B.Sc.
25.	Junior Tester	Mr. L. V. Sundararaman, B.A.
26.	Junior Tester	Mr. P. S. Sambamurthy.
27.	Junior Tester	Mr. R. G. Panvalkar, B.Sc.
28.	Junior Tester	Mr. G. J. Kharkar, B.Sc. (on military duty).
29.	Junior Tester	Mr. A. J. Farid.
30.	Junior Tester	Mr. P. V. Nachane, B. Sc.
31.	Junior Tester	Mr. C. S. Ramnathan, B.Sc.
32.	Junior Tester	Mr. B. N. Prabhakar, M.Sc.
33.	Junior Tester	Mr. S. B. Mogre, M.Sc.
34.	Junior Tester	Mr. P. D. Vakil (services lent to I.S.D., Bombay).
35.	Statistical Clerk	Mr. R. Krishna Iyer.
36.	Statistical Clerk	Mr. P. K. Waglé.
37.	Electrician	Mr. H. Lobo, L.E.E. (V.J.T.I.).
38.	Spinning Assistant	Mr. N. Iyengar.
39.	Draughtsman	Mr. B. G. Mehta.
40.	Mechanic	Mr. J. B. Kharas.
41.	Junior Tester (Offg.)	Mr. C. A. S. Iyer, B.Sc.
42.	Junior Tester (Offg.)	Mr. M. Bhasker Rao.
43.	Junior Tester (Offg.)	Mr. R. B. Joshi, B.Sc.
44.	Junior Tester (Offg.)	Mr. S. Ramanathan.
45.	Junior Tester (Offg.)	Mr. T. R. Krishnamurthy, B.Sc.
46.	Junior Tester (Offg.)	Mr. N. C. Chiplonkar, B. Sc.

INSTITUTE OF PLANT INDUSTRY, INDORE.

47.	Director	Rao Bahadur V. A. Tamhane, M.Sc., M.Ag. (Bom.), I.A.S. (Retd.).
48.	Personal Assistant	Mr. A. N. Srivastava, M.Sc. (Lucknow).
49.	Agricultural Chemist	Dr. A. Sreenivasan, M.A., D.Sc. (Madras), A.I.C.

**LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—contd.**

INSTITUTE OF PLANT INDUSTRY, INDORE—(contd.)

- | | |
|---|-------------------------------------|
| 50. Extension Officer | Mr. Kuber Singh, B.Ag. (Bombay). |
| 51. Farm Superintendent and part-time
Extension Officer.. .. | Mr. S. C. Talesara, B.Ag. (Bombay). |
| 52. Plant Breeder | Mr. C. P. Dutt, M.Sc. (Calif.). |
| 53. Assistant Plant Breeder | Mr. K. M. Simlote, B.Ag. (Nagpur). |
| 54. Assistant Farm Superintendent and
Seed Multiplication Officer .. | Mr. L. N. Desai, B.Sc. (Agri). |
| 55. Librarian | Mr. B. H. Khan. |
| 56. Artist | Mr. J. S. Onkar. |

COTTON GENETICS RESEARCH SCHEME, INDORE.

- | | |
|--------------------------------------|--|
| 57. Geneticist and Botanist | Mr. K. Ramiah, M.B.E., M.Sc., Dip. Agri.
(Cantab.), L.Ag. |
| 58. Statistician | Dr. V. G. Panse, B.Sc. (Bom.), Ph.D.(Lond.). |
| 59. Senior Botanical Assistant | Mr. P. D. Gadkari, M.Sc. (Nagpur). |
| 60. Genetical Assistant | Mr. Bholanath, M.Sc. (Punjab). |
| 61. 2nd Botanical Assistant | Mr. D. Ganesan, B.A., M.Sc. (Madras). |

BOMBAY.

(i) Broach Cotton Breeding Scheme.

- | | |
|-------------------------------|---|
| 62. Cotton Breeder | Mr. P. L. Patol, M.Sc. (Agri.), (Iowa, U.S.A.). |
| 63. Botanical Assistant | Mr. R. J. Naik, M.Ag. (Bombay). |
| 64. Botanical Assistant | Mr. D. D. Gopani, B.Sc. (Agri.). |

(ii) Jalgaon Cotton Breeding Scheme.

- | | |
|---------------------------------|--|
| 65. Agriocultural Officer | Mr. B. T. Thakar, B.Ag. |
| 66. Agricultural Officer | Mr. S. N. Deshpande, B.Sc. (Agri.) (Bombay). |

(iii) Scheme for Interspecific Hybridisation in Cottons at Surat.

- | | |
|---------------------------------|--|
| 67. Agricultural Officer | Mr. K. C. Amin, B.Ag. |
| 68. Cytological Assistant | Mr. N. K. Iyengar, M.A., M.Sc. (London). |
| 69. Agricultural Officer | Mr. S. M. Patel, B.Ag. |

(iv) Poona Cotton Wilt Breeding Scheme.

- | | |
|----------------------------------|-------------------------------------|
| 70. Pathological Assistant | Mr. J. D. Ranadive, B.Ag. (Bombay). |
| 71. Pathological Assistant | Mr. Y. S. Kulkarni, B.Ag. (Bombay). |

**LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—contd.**

(v) Scheme for Breeding of Wilt Resistant Cottons in Surat Area.

72. Agricultural Overseer Mr. S. P. Shah, B.Ag. (Bombay).

(vi) Scheme for Improvement of Nagad Cotton at Viramgam.

73. Agricultural Overseer Mr. S. T. Patel, M.Ag. (Bombay).

(vii) Surat Seed Distribution Scheme.

74. Cotton Assistant Mr. V. V. Patel, B.Ag. (Bombay).

(viii) Khandesh (Jarila) Seed Distribution Scheme.

75. Agricultural Officer I/C, Bhadgaon
Farm Mr. D. B. Barve, B.Ag.

76. Cotton Superintendent, Jalgaon .. Mr. N. V. Bhagwat, B.Ag.

77. Agricultural Officer Mr. C. A. Borndey, B.Ag.

78. Agricultural Officer Mr. S. Y. Sarant, B.Ag.

79. Agricultural Officer Mr. B. P. Joshi, B.Sc. (Agri.).

80. Agricultural Officer Mr. M. V. Pandit, B.Sc. (Agri.).

(ix) B.D. 8 Seed Distribution Scheme.

81. Cotton Supervisor, Broach Mr. L. N. Patel, B.Ag. (Bombay).

82. Agricultural Officer, Amod Mr. D. A. Dave, B.Ag. (Bombay).

(x) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme.

83. Agricultural Officer, Dharwar .. Mr. S. M. Tippashetti, B.Ag.

84. Agricultural Officer, Bailhongal .. Mr. A. B. Hungund, B.Sc. (Agri.).

85. Agricultural Officer, Bagalkot .. Mr. B. S. Tadsur, B.Ag.

86. Agricultural Officer, Athani .. Mr. N. R. Kulkarni, B.Sc. (Agri.).

87. Agricultural Officer, Havari .. Mr. G. P. Argikar, B.Sc. (Agri.).

88. Technological Assistant (Dharwar) .. Mr. H. R. Nayak, Inter Science (Madras).

89. Technological Assistant (Surat) .. Mr. M. U. Parmar, M.Sc. (Bombay).

SIND.

(i) Scheme for Cotton Jassid Investigation in Sind.

90. Research Assistant Dr. Nazir Ahmed, M.Sc. (Calcutta), Ph.D.
(London), D.I.C. (London).

**LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—contd.**

(ii) Sind Seed Distribution Scheme.

91.	Cotton Superintendent, Left Bank, Hyderabad	.. ..	Mr. W. P. Shahani, B.Ag. (Bombay).
92.	Senior Assistant	.. ..	Mr. R. M. Ranji, Dip. Agri. (Bombay).
93.	Junior Assistant	.. ..	Mr. S. M. Khalsa, B.Ag. (Bombay).
94.	Junior Assistant	.. ..	Mr. Md. Amin Bhatti, B.Ag. (Bombay).
95.	Junior Assistant	.. ..	Mr. S. G. Kahai, B.Ag. (Bombay).
96.	Junior Assistant	.. ..	Mr. K. G. Rajpur, B.Ag. (Bombay).
97.	Junior Assistant	.. ..	Mr. H. N. Bolina, B.Ag. (Bombay).
98.	Junior Assistant	.. ..	Mr. K. K. Advani, B.Ag. (Bombay).
99.	Junior Assistant	.. ..	Mr. G. H. W. Abbasi, B.Ag. (Bombay).
100.	Junior Assistant	.. ..	Mr. G. M. Advani, B.Ag. (Bombay).

(iii) Scheme for Investigation into Black Headed Cricket in Sind.

101.	Assistant Entomologist in charge of the Scheme.	.. ..	Mr. Gobind Ram, M.Sc. (Hons.) (Punjab).
102.	Graduate Assistant	.. ..	Mr. V. G. Rajani, B.Ag. (Bom.).

(iv) Scheme for Production of Long Staple Cottons in Sind.

103.	Cotton Botanist	.. ..	Dr. R. Sankaran, M.A. (Madras), Ph.D. (London), D.I.C.
104.	Senior Assistant	.. ..	Mr. T. J. Chellaramani, B.Ag. (Bombay).
105.	Junior Assistant	.. ..	Mr. D. H. Bhavnani, B.Sc. (Agri.) (Bombay), M.Sc. (Agri.) (Texas, U.S.A.).

(v) Sind Bollworm Scheme.

106.	Entomological Assistant	.. ..	Mr. G. R. Sharma, B.Sc.
107.	Entomological Assistant	.. ..	Mr. L. R. Mahindra, B.Sc.
108.	Technological Assistant (Mirpurkhas)	.. ..	Mr. S. M. Navaz, B.Sc.

**LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—contd.**

CENTRAL PROVINCES AND BERAR.

(i) Central Provinces and Berar Cotton Breeding Schemes.

109. Economic Botanist for Cotton	..	..	*Mr. S. S. Pande, M.Sc.
110. Research Officer	..	..	.. Mr. S. C. Roy, L.Ag., and Post-Graduate, Pusa.
111. Research Officer	..	..	.. Mr. D. L. Janoria, L.Ag. (Hons.).
112. Junior Research Assistant	..	..	.. Mr. D. Y. Bhand, L.Ag. (Hons.).
113. Junior Research Assistant	..	..	.. S. L. Nema, B.Ag.
114. Junior Research Assistant	..	..	.. Mr. N. P. Deshmukh, B.Ag.

(ii) Scheme for Extension and Marketing of V. 434 Cotton.

115. Agricultural Assistant	..	..	.. Mr. G. C. Tiwari, Certificate Course of Agricultural College, Nagpur.
116. Agricultural Assistant	..	..	.. Mr. L. P. Khare, B.Ag.
117. Agricultural Assistant	..	..	.. Mr. K. S. S. Chauhan, B.Ag.
118. Agricultural Assistant	..	..	.. Mr. G. N. Wardadkar, B.Ag.
119. Agricultural Assistant	..	..	.. Mr. M. D. Anandao, B.Ag.
120. Agricultural Assistant	..	..	.. Mr. T. N. Puranik, B.Ag.
121. Agricultural Assistant	..	..	.. Mr. V. G. Deodhar, B.Sc. (Agri.).
122. Agricultural Assistant	..	..	.. Mr. D. R. Soman, B.Ag.
123. Agricultural Assistant	..	..	.. Mr. S. G. P. Tiwari, B.Ag.
124. Agricultural Assistant	..	..	.. Mr. B. I. Nema, B.Sc. (Agri.).
125. Agricultural Assistant	..	..	.. Mr. K. M. Shingare, B.Sc. (Agri.).
126. Agricultural Assistant	..	..	.. Mr. W. P. Sele, B.Sc. (Agri.).

(iii) Scheme for Distribution and Marketing of Buri 107 Cotton.

127. Agricultural Assistant	..	..	.. Mr. J. P. Nema, B.Ag.
128. Agricultural Assistant	..	..	.. Mr. P. R. Roday, B.Sc. (Agri.).

MADRAS.

(i) Pemphres Scheme.

129. Assistant Botanist	..	..	.. Mr. G. Sheshadri Ayyangar, M.A.
130. Assistant Botanist	..	..	.. Mr. V. Ramaswami Mudaliar, B.A.

*Paid by the Provincial Government.

LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—*contd.*

(ii) *Scheme for Improvement of Mungari Cotton.*

131. Gazetted Assistant Mr. V. K. Subramaniam Mudaliar, L.Ag.

(iii) *Scheme for Improvement of Oocanadas Cotton.*

132. Gazetted Assistant Mr. Balasubrahmanya Ayyar, B.A.,
B.Sc. (Ag.).
133. Gazetted Assistant Mr. A. Raghavan, B.Sc. (Agri.).
134. Technological Assistant (Coimbatore) Mr. K. S. Marar, B.A., LL.B.

PUNJAB.

(i) *Punjab Botanical Scheme.*

135. Cotton Research Botanist Mr. Mohammad Afzal* B.Sc. (Agri.) (Punjab),
A.I.C.T.A. (Trinidad).
136. Assistant to Cotton Research
Botanist Dr. Sawan Mal Sikka, B.Sc. (Agri.), Assoc.
I.A.R.I., Ph.D. (London).
137. Field Research Assistant Ch. Mohd. Akbar, L.Ag.
138. Agricultural Assistant S. Fateh Ali Shah, B.Sc. (Agri.).
139. Agricultural Assistant Bh. Bantasingh, B.Sc. (Agri.).
140. Agricultural Assistant Bh. Autar Singh, B.Sc. (Agri.).
141. Agricultural Assistant Bh. Santokh Singh, B.Sc. (Agri.).
142. Agricultural Assistant (A Class) .. Ch. Mohammad Rashid Khan, L.C. (Course),
Munshi Fazil, B.A. (Punjab University)..
143. Agricultural Assistant (A Class) .. Ch. Ghulam Rasul, B.Sc. (Agri.).
144. Agricultural Assistant (B Class) .. Mr. S. E. Daniel, L.C. (Course).
145. Agricultural Assistant (B Class) .. Mr. Sikandar Lal Sehgal, B.Sc. (Agri.).
146. Statistical Assistant Mr. L. Dwarka Nath Nanda, M.A., B.Sc.,
(Agra).
147. Technological Assistant (Lyallpur) .. Mr. S. Raja Raman, B.A. (Madras), M.Sc.
(Benares), A. Inst. P. (London).

LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—contd.

(ii) *Scheme for Improvement of Punjab-American 289F Cotton.*

148. Agricultural Assistant Mr. S. P. Kohli, B.Sc. (Agri.).

(iii) *Punjab Root Rot Scheme.*

149. Agricultural Assistant (B.Class) .. L. Mulk Raj Sikka, B.Sc. (Agri.)

(iv) *Punjab Physiological (Cotton Failure Research) Scheme.*

150. Plant Physiologist Prof. R. H. Dastur, M.Sc., F.L.S.
151. Biochemist Dr. K. M. Samant, M.Sc., Ph.D.
152. Agricultural Assistant Mr. Abdul Ahad, M.Sc. (Agri.).
153. Agricultural Assistant Bh. Sucha Singh, B.Sc. (Agri.).
154. Agricultural Assistant Bh. Mukhtar Singh, B.Sc. (Agri.).
155. Agricultural Assistant Mr. Harmandar Lal Uppal, M.Sc. (Hons.).
156. Agricultural Assistant Bh. Amrik Singh, B.Sc. (Agri.).
157. Agricultural Assistant M. Kanwar Singh Yadava.

(v) *Scheme for Cotton Jassid Investigation.*

158. Agricultural Assistant Mr. Manzur Abbas, B.Sc. (Agri.).

UNITED PROVINCES.

United Provinces Botanical Scheme.

159. Senior Botanical Assistant Mr. B. M. Dabral, M.Sc.
(Plant Breeding).
160. Senior Botanical Assistant, Plant
Breeding & Genetics of Cotton.. Mr. R. M. Arora, M.Sc.
161. Statistical Assistant Mr. G. K. Sant, B.Sc.
162. Technological Assistant (Cawnpore) Mr. S. Samson, B.Sc.

BENGAL.

Comilla Cotton Scheme.

163. Cotton Research Officer Mr. V. N. Paranjpe, B.Sc. (Allahabad).

LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—contd.

HYDERABAD STATE.

(i) *Hyderabad Botanical Scheme.*

164. Assistant Cotton Research Botanist Mr. D. V. Narayanayya, Dip. Agri. (Poona).
165. Assistant Cotton Research Botanist Mr. V. K. Bederker, B.A. (Madras), B.Ag.
(Bombay).
166. Plant Breeding Assistant Mr. Mohd. Abdul Jaleel.
167. Technological Assistant (Parbhani) Mr. K. G. Deo, Inter Arts.

(ii) *Scheme for Improvement of Kumbia Cotton.*

168. Senior Research Assistant Mr. N. R. Yardi, B.Ag. (Bombay).

(iii) *Hyderabad Seed Distribution Scheme.*

169. Inspector Mr. M. V. Chitnis.

BARODA STATE.

(i) *Baroda Root Rot Scheme.*

170. Mycological Assistant Mr. G. H. Desai, B.Ag. (Bombay).
171. Breeding Assistant C. S. Krishna Iyer, B.Sc. (Agri.) (Madras).

(ii) *Baroda Plant Puller Propaganda Scheme.*

172. Plant Puller Officer, Baroda Dist. .. Mr. D. H. Jani, B. Ag.
173. Assistant Plant Puller Officer,
Baroda District Mr. R. S. Patel.
174. Assistant Plant Puller Officer, Navsari
Dist. Mr. R. N. Desai.

(iii) *Baroda B.D. 8 Seed Distribution Scheme.*

175. Cotton Officer, Propaganda Work .. Mr. K. C. Patwa, B.Ag., F.R.H.S.

LIST OF SCIENTIFIC, TECHNICAL AND OTHER OFFICERS PAID FROM THE
INDIAN CENTRAL COTTON COMMITTEE'S FUNDS AS ON
AUGUST 31st, 1941—concl'd.

(iv) *Dholleras Cotton Improvement Scheme.*

176. Assistant Cotton Breeder, Amreli .. Mr. A. F. Patel, B.Ag. (Bombay).
177. Breeding Assistant, Jagudan .. Mr. R. T. Jog, M.Sc. (Bombay).

(v) *Scheme for Marketing of 1027 A.L.F. Cotton.*

178. Marketing Officer Mr. J. N. Ambegaonkar, B.A., B. Com., LL.B.

BIKANER STATE.

Bikaner Bengals Cotton Improvement Scheme.

179. Cotton Assistant Mr. Arjan Singh, B.Sc.

MYSORE STATE.

Mysore (Doddahathi) Scheme.

180. Junior Assistant Botanist, in charge
of Field operations at Irwin Canal
Farm, Mandya Mr. G. Srinivasa Iyengar, M.Sc. (Mysore).
181. Sub-Assistant Botanist in charge of
Laboratory investigations at
Bangalore and Fieldwork at
Hebbal Farm Mr. S. G. Narasimhachar, M.Sc. (Mysore).
-

CONTENTS.

	PAGE.
CHAPTER I.	
1. Constitution and Objects	1
Agricultural Research Sub-Committee	2
Technological Research Sub-Committee	3
Wider Markets Sub-Committee	4
Cotton Forecast Sub-Committee	4
Cotton Ginning and Pressing Factories Sub-Committee	5
Research Students Selection Sub-Committee	5
Standards Sub-Committee	5
2. Administration	7
3. Meetings	8
4. Provincial Cotton Committees	10
CHAPTER II.	
Cotton Statistics	11-22
1. Improvement in staple and yield	11
2. Demand for various types of Indian cotton	15
3. Stocks	15
4. Indian mill consumption	16
5. Exports	16
6. Statistics of cotton pressed	16
7. Unpressed (loose) cotton statistics	17
8. Statistics of cotton ginned	17
9. Indian cotton situation—1940-41	18
10. Collection of statistics of cotton imported into Bombay by road	19
11. Periodical reviews of the state of foreign trade in Indian cotton	20
12. Improvement of cotton forecasts	20
13. Report on the accuracy of the all India cotton forecasts	21
14. Publications	21
CHAPTER III.	
Research	23-71
1. Fundamental Research	23
2. Research on Cotton Technology	27
3. Cotton Research in Provinces and States	28
(i) Bombay.—	
(a) Broach Cotton Breeding Scheme	28
(b) Jalgaon Cotton Breeding Scheme	30
(c) Scheme for breeding wilt-resistant cottons in Surat area	31
(d) Scheme for improvement of Wagad cotton at Viramgam and Jagudan	32
(e) Scheme for inclusion of Northern and Western cottons in programme of work of Dry Farming Scheme at Bijapur	33
(f) Scheme for interspecific hybridisation in cottons at Surat	34

	PAGE
(ii) <i>Sind.</i> —	
(a) Scheme for Cotton Jassid Investigation	35
(b) Scheme for investigation into Black-headed Cricket in Sind	36
(c) Scheme for production of long staple cottons in Sind	37
(d) Scheme for bollworm investigation and clean-up campaign in Sind	38
(iii) <i>Punjab.</i> —	
(a) Punjab Botanical Scheme	40
(b) Scheme for improvement of Punjab-American 289F/K.25 cotton	42
(c) Physiological Scheme	43
(d) Root Rot Scheme	46
(e) Cotton Jassid Investigations in the Punjab	47
(iv) <i>Central Provinces and Berar.</i> —	
Central Provinces and Berar Cotton Breeding Scheme	48
(v) <i>Madras.</i> —	
(a) Pempheris Scheme	49
(b) Scheme for improvement of Mungari cotton in Madras Province	50
(c) Madras Nadam Cotton Breeding Scheme	52
(d) Scheme for Improvement of Cocanadas Cotton in Madras Province	53
(e) Scheme for investigating the possibilities of control of Cotton Stem Weevil of South India	54
(vi) <i>United Provinces.</i> —	
The United Provinces Botanical Scheme	56
(vii) <i>Bengal.</i> —	
(a) Comilla Cotton Scheme	57
(b) Scheme for cultivation of long staple cotton in Bengal	58
(viii) <i>Baluchistan.</i> —	
Scheme for co-ordination of Black-headed Cricket in Sind and Baluchistan	58
(ix) <i>Hyderabad.</i> —	
(a) Botanical Research Scheme	59
(b) Hyderabad Bollworm Clean-up Scheme	62
(c) Scheme for inclusion of Northern and Western Cottons in Programme of work of Dry Farming Scheme at Raichur	64
(d) Scheme for improvement of Kumpta Cotton	65
(x) <i>Baroda.</i> —	
(a) Root Rot Scheme	67
(b) Plant Puller Propaganda Scheme	67
(c) Scheme for improvement of Mathio Cotton at Amreli	68
(xi) <i>Bikaner.</i> —	
Bengals Cotton Improvement Scheme	68
(xii) <i>Mysore.</i> —	
Mysore (Doddahathi) Cotton Scheme	70

CHAPTER IV.

<i>Seed Distribution and Extension Schemes—</i>	..	..	..	..	..	72-87
<i>1. Bombay.—</i>						
(a) Surat Seed Distribution Scheme..	..	..	..	..	..	72
(b) Scheme for Control of Selection 1A cotton ..	..	..	..	..	..	73
(c) Jarila Seed Distribution and Extension Scheme ..	..	..	..	..	..	74
(d) Deccan Canals (Banilla) Seed Distribution Scheme ..	..	..	..	..	..	75
(e) B. D. 8 Seed Distribution Scheme ..	..	..	..	..	..	76
(f) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme ..	..	..	..	..	..	76
(g) Scheme for maintenance of nucleus of pure seed of improved varieties of cotton ..	..	..	..	..	..	77
<i>2. Sind.—</i>						
(a) Sind Seed Distribution and Extension Scheme ..	..	..	..	..	..	79
(b) Scheme for maintenance of nucleus of pure seed of improved varieties of cotton ..	..	..	..	..	..	80
(c) Financing of Seed Distribution ..	..	..	..	..	..	80
<i>3. Central Provinces and Berar.—</i>						
(a) Verum Seed Distribution and Marketing Scheme ..	..	..	..	..	..	80
(b) Scheme for Distribution and Marketing of Buri 107 cotton ..	..	..	..	..	..	81
(c) Maintenance of nucleus of pure seed of improved strains of cotton ..	..	..	..	..	..	82
<i>4. Madras.—</i>						
(a) Madras Co.2 Seed Distribution Scheme..	..	..	..	..	..	83
(b) Maintenance of nucleus of pure seed of improved varieties of cotton, Co.2, H. 1 and K.1. ..	..	..	..	..	..	83
<i>5. Hyderabad State.—</i>						
Seed Distribution Scheme ..	..	..	..	..	..	84
<i>6. Baroda State.—</i>						
(a) Baroda (Navsari) Seed Storage Scheme ..	..	..	..	..	..	85
(b) Baroda B. D. 8 Seed Distribution Scheme ..	..	..	..	..	..	86
<i>7. Schemes closed down</i> ..	..	..	..	..	..	87

CHAPTER V.

<i>Progress in the Introduction of Improved Varieties of Cotton—</i>	..	..	..	88-96
(i) Bombay ..	..	..	..	88
(ii) Sind ..	..	..	..	90
(iii) Punjab ..	..	..	..	91
(iv) Central Provinces and Berar ..	..	..	..	93
(v) Madras ..	..	..	..	93
(vi) United Provinces ..	..	..	..	95
(vii) Hyderabad State ..	..	..	..	95
(viii) Baroda State ..	..	..	..	96
(ix) Rajpipla State ..	..	..	..	96

CHAPTER VI.

PAGE.

General.—

97-108

1. Improvement in Marketing	97
2. Legislation	99
(i) Cotton Transport Act	99
(ii) Cotton Ginning and Pressing Factories Act	101
(iii) Prevention of introduction of foreign cotton pests	104
(iv) Madras Cotton Control Act	105
(v) Bombay Cotton Control Act	105
(vi) Central Provinces Cotton Control Act	106
(vii) Baroda Cotton Control Act	106
(viii) Bhopal Cotton Control Act	106
(ix) United Provinces Cotton Pest Control Act	107
3. Research Students	107
4. Collection and supply of information	107
5. Publications	108

APPENDICES.

I. Members of the Committee	109
II. Balance Sheet as at 31st March, 1941; statement of receipts and payments for the year ended 31st March, 1941; statement showing expenditure on the schemes financed by the Committee up to 31st March, 1941	111
III. Receipts at mills in India of raw cotton classified by varieties	138
IV. Exports by sea of Indian raw cotton classified by varieties	142
V. Stocks of Indian raw cotton held in India by the mills and the trade on 31st August, 1940 and 1941.. .. .	144
VI. Indian raw cotton consumed in Indian mills	153
VII. Revised trade classification of Indian cottons	155
VIII. Sind Cotton Ginning and Pressing Factories Rules, 1941, under the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936	158
IX. List of scientific, technical and other officers paid from the Indian Central Cotton Committee's funds as on August 31st, 1941	165

INDIAN CENTRAL COTTON COMMITTEE. TWENTIETH ANNUAL REPORT.

CHAPTER I.

1. CONSTITUTION AND OBJECTS.

THE Indian Central Cotton Committee was constituted by the Government of India in the Department of Revenue and Agriculture, in their Resolution No. 404-22, dated the 31st March, 1921, as a result of the recommendation of the Indian Cotton Committee of 1917-18. At first, the Committee was purely an advisory body but, with its incorporation under the Indian Cotton Cess Act in 1923, it became an administrative body having at its disposal funds "for the improvement and development of the growing, marketing and manufacture of cotton in India." The funds of the Committee are derived from the cotton cess of two annas (four annas for the first three years) levied on every bale of Indian cotton either exported from British India or brought under process in a mill in British India. Including, as it does, representatives of growers, agricultural officers, traders, spinners and manufacturers, the Committee is an invaluable forum for the discussion of the many problems affecting the cotton industry. The ever-increasing understanding which has arisen from the association of leading commercial representatives with growers and research workers has led to developments of far-reaching consequence. Whilst the Committee's constitution ensures a broad outlook on the many problems which fall within its purview, its main concern is the interest and welfare of the cotton grower. The furtherance of this object, it should be mentioned, is greatly facilitated by the readiness with which trade associations, particularly the East India Cotton Association, take action on recommendations designed to benefit the cotton grower.

A list of the members constituting the Committee and the various interests they represent as on 31st August, 1941, is given in Appendix I. Under the

Indian Cotton Cess Rules, members, who are not *ex-officio* members, hold office for three years and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Governor General in Council under Section 4(xi) of the Indian Cotton Cess Act is three years or such lesser period as may be specified in the notification of appointment.

Most of the detailed work of the Committee is carried on with the help of Sub-Committees, appointed annually, which hold office from the 1st April. This arrangement has proved very effective in practice as it not only enables the various schemes coming up for the consideration of the Committee to be thoroughly scrutinised and vetted but considerably lightens the task of that body at its half-yearly meetings when there is usually a very heavy agenda to be dealt with in a limited space of time. The functions of the various Sub-Committees and their composition as on 31st August, 1941, are given below :—

Agricultural Research Sub-Committee.—As its name implies, this Sub-Committee deals with matters pertaining to the agricultural schemes financed by the Committee. It reviews the progress reports on and programmes of work of the Committee's research, seed distribution and marketing schemes and makes such observations on them as it considers necessary for their future conduct. It examines proposals for new schemes and extensions of old ones. The progress of the work done by the Committee's research students also comes under its scrutiny. It assembles half-yearly, usually a day or two before the meetings of the Indian Central Cotton Committee. The constitution of this Sub-Committee was laid down at the 10th meeting of the Indian Central Cotton Committee and additions have been made from time to time; the members during the year were :—

- I. *The President*—Mr. P. M. Kharegat (*ex-officio*),
 - II. *The Vice-President*
 - III. *The Co-operative Banking Representative.*
- } Sir Chunilal V. Mehta (*ex-officio*),
- IV. *Cotton Growers' Representatives.*—Sir William Roberts, Sardar Rao Bahadur Bhimabhai Ranchodji Naik, Mr. Roger Thomas, Rao Bahadur Sir Madhaorao Deshpande,

V. *Cotton Trade Representatives*.—Sir Purshotamdas Thakurdas, Mr. Chunilal B. Mehta, Mr. Chandulal P. Parikh, Mr. J. Vonesch, Mr. L. F. H. Goodwin, Dr. Chellaram Shewaram,

VI. *Agricultural Officers*.—The Agricultural Commissioner with the Government of India (*ex-officio*), Mr. H. R. Stewart, Mr. W. J. Jenkins, Mr. P. H. Rama Reddi, Mr. R. G. Allan, Rao Bahadur K. I. Thadani, Mr. Nizam-ud Din Hyder, Sardar D. K. Jadhav, Mr. Vishnu Sahay, Mr. J. C. McDougall, Mr. T. G. Rama Iyer, Rao Bahadur S. S. Salimath,

VII. *Additional Members*.—Dewan Bahadur Sir T. Vijayaraghavacharya, Mr. Mohammad Afzal, Mr. K. Ramiah, Rai Saheb Kalidas Sawhney, Professor R. H. Dastur, Rao Bahadur V. Ramanatha Ayyar, Dr. B. L. Sethi, Dr. R. Sankaran, Mr. S. S. Pande, Dr. V. G. Panse,

VIII. The Secretary.

Technological Research Sub-Committee.—This Sub-Committee deals with matters relating to Technological Research. It was originally constituted at the January 1924 meeting of the Committee with the object of advising the Director of the Technological Laboratory on technical matters. It meets a day or two in advance of the half-yearly meetings of the full Committee. The following were the members of this Sub-Committee during the year under report :—The President—Mr. P. M. Kharegat (*ex-officio*), The Vice-President—Sir Chunilal V. Mehta (*ex-officio*), The Agricultural Commissioner with the Government of India (*ex-officio*), Sir Purshotamdas Thakurdas, Dewan Bahadur Sir T. Vijayaraghavacharya, Sir Sorab Saklatvala, Mr. Chunilal B. Mehta, Sir William Roberts, Sir Shri Ram, Mr. H. R. Stewart, Mr. W. J. Jenkins, Mr. P. H. Rama Reddi, Mr. J. C. McDougall, Mr. Chandulal P. Parikh, Mr. L. F. H. Goodwin, Capt. S. R. Pocock, Mr. J. Vonesch, Rao Saheb P. V. Deshmukh, Mr. E. F. G. Gilmore, Dr. Nazir Ahmad, Rao Bahadur V. Ramanatha Ayyar, Rai Saheb Kalidas Sawhney, Mr. Y. G. Deshpande, Mr. K. Ramiah, Mr. Roger Thomas, Dr. R. Sankaran, Dr. B. L. Sethi, Mr. F. F. Bignell and Mr. A. D. Walwyn (Representing the Bombay Millowners' Association), Seth Himatlal Kalidas and Seth Chinubhai Chimanlal (Representing the Ahmedabad Millowners' Association), Mr. R. G. Saraiya and Mr. Gatulal

Rangildas (Representing the East India Cotton Association, Ltd.) and Mr. A. B. Kotak and Mr. Kisharam Lekhraj (Representing the Karachi Cotton Association, Ltd.). Two meetings of this Sub-Committee were held during the year under review.

Wider Markets Sub-Committee.—This Sub-Committee was constituted by the Committee at its meeting held in August 1933 for investigating the question of finding wider markets for Indian cotton. The members of this Sub-Committee during the year were:—The President (Mr. P. M. Kharegat), The Vice-President (Sir Chunilal V. Mehta), Sir Purshotamdas Thakurdas, Dewan Bahadur Sir T. Vijayaraghavacharya, Sir Sorab Saklatvala, Dr. W. Burns, Dr. T. E. Gregory, Mr. H. R. Stewart, Mr. W. J. Jenkins, Sir William Roberts, Mr. P. H. Rama Reddi, Sardar Rao Bahadur Bhimbhai Ranchodji Naik, Mr. Chandulal P. Parikh, Mr. Chunilal B. Mehta, Rao Bahadur K. I. Thadani, Mr. Nizam-ud Din Hyder, Rao Saheb P. V. Deshmukh, Mr. L. F. H. Goodwin, Mr. Roger Thomas, Kanwar Raj Nath, Seth Jivandas Ladhabbhai, Dr. Nazir Ahmad, Mr. R. G. Saraiya, Mr. Y. G. Deshpande, Rai Saheb Kalidas Sawhney, Mr. J. C. McDougall, Mr. Vishnu Sahay, Mr. V. Ramdas Pantulu and Mr. J. Vonesch.

Cotton Forecast Sub-Committee.—Constituted by the Committee at its meeting held in February 1933, this Sub-Committee is concerned with matters connected with the improvement of the accuracy of cotton forecasts of India. It usually meets half-yearly, a day or two before the meetings of the full Committee. Two meetings of this Sub-Committee were held during the year under report. The composition of the Sub-Committee was as follows:—The President (*ex-officio*), The Vice-President, the Agricultural Commissioner with the Government of India (*ex-officio*), the Director-General of Commercial Intelligence and Statistics, the Director of Agriculture, Bombay Province, the Director of Agriculture, Punjab, the Director of Agriculture, Madras, the Director of Agriculture, United Provinces, the Director of Agriculture, Central Provinces and Berar, the Director of Agriculture, Sind, the Director of Agriculture, H. E. H. the Nizam's Government, the Commissioner of Agriculture, Baroda, the Director of Statistics, H. E. H. the Nizam's Government, the Director of Land Records, Central Provinces and Berar, the Deputy Director of Statistics, Department of Commercial Intelligence and Statistics, the Statistical Officer, Department of Industries and Commerce, Madras, Dr. T. E. Gregory,

Mr. J. Vonesch, Mr. L. F. H. Goodwin, Sir William Roberts, Mr. Chunilal B. Mehta, Mr. Roger Thomas and Dr. V. G. Pause.

Cotton Ginning and Pressing Factorles Sub-Committee.—This Sub-Committee is appointed by statute to attend to matters arising out of the Cotton Ginning and Pressing Factories Act, 1925. Two meetings of this Sub-Committee were held during the year under review. The members of the Sub-Committee during the year were:—The President—Mr. P. M. Kharegat—the Vice-President, the Co-operative Banking Representative—Sir Chunilal V. Mehta (*ex-officio*), Sir Purshotamdas Thakurdas, Sir Sorab Saklatvala, Mr. J. Vonesch, Sir William Roberts, Mr. W. J. Jenkins, Rao Sahab P. V. Deshmukh, Dr. Chellaram Shewaram, Captain S. R. Pocock, Mr. Chandulal P. Parikh, Mr. L. F. H. Goodwin, Mr. J. M. Doak, Mr. J. C. McDougall and Dr. Nazir Ahmad.

Research Students Selection Sub-Committee.—This Sub-Committee is concerned with the selection of students for scholarships or training grants for research in the several sciences relating to cotton. The members of this Sub-Committee during the year under review were:—The President—Mr. P. M. Kharegat, The Vice-President—Sir Chunilal V. Mehta, Dewan Bahadur Sir T. Vijayaraghavacharyn, Dr. W. Burns, Dr. Nazir Ahmad, Mr. K. Ramiah and the Secretary.

Standards Sub-Committee—Constituted in April, 1933, this Sub-Committee is responsible for the preparation, for use in India, of universal standards of certain growths of cotton dealt with in common both by the East India Cotton Association and the Karachi Cotton Association and of certain other varieties with which only the former Association is concerned. Five meetings were held during the year. The following were the members of this Sub-Committee during the period under review:—Mr. C. P. Bramble (Representing the Imperial Council of Agricultural Research), Mr. Haridas Madhavdas and Mr. Jamnadas Ramdas (Representing the East India Cotton Association), Mr. W. S. Priestley and Mr. Kisharam Lekhraj (Representing the Karachi Cotton Association, Ltd.), Rao Bahadur Sir Madhaurao Deshpande and Mr. Suganchand Tapadia (Representatives of cotton growers of Oomras tract), Mr. Y. R. Joshi and Mr. A. J. Kapadia (Representatives of cotton growers of Broach tract), Mr. Mulchand V. Shah and Mr. Bansilal Jivanlal Desai (Representatives of cotton growers of Dholleras tract), Mr. F. B. Lokshmeshwar

and Mr. S. T. Patil (Representatives of cotton growers of *Kumpta* tract), Mr. Vadilal Chunilal Doshi and Mr. Vrajlalbhai Narottamdas Trivedi (Representatives of cotton growers of *Mathia* tract).

In addition to the above Sub-Committees, Special Sub-Committees are appointed from time to time to deal with specific matters which do not directly fall within the purview of any of the above Sub-Committees. The Special Sub-Committee on Crop Cutting Experiments on Cotton, referred to in the last year's report, again met during the year under report, for the purpose of examining and reporting on the replies received from the Provinces and States on the proposed co-ordinated scheme of crop-cutting experiments on cotton on an all-India basis. The object of this scheme is to obtain, as early as possible, reliable standard yield figures of cotton which would be of material assistance in the preparation of cotton forecasts. The report of this Special Sub-Committee and the recommendations of the Committee thereon are dealt with under "Cotton Statistics."

During the period under review the following members represented the Committee on the Board of Governors of the Institute of Plant Industry, Indore:—Mr. P. M. Kharegat, C.I.E., I.C.S., (President, Indian Central Cotton Committee), Sir Chunilal V. Mehta, K.C.S.I. (Vice-President, Indian Central Cotton Committee), Mr. W. J. Jenkins, C.I.E., I.A.S., (Director of Agriculture, Bombay Province), and Mr. D. N. Mahta, (Secretary, Indian Central Cotton Committee).

Mr. H. Sitarama Reddy represented the Committee on the Imperial Council of Agricultural Research up to the 31st March, 1941, when he retired and Mr. Roger Thomas was appointed in his place. Under Article 51, as amended, of the Articles of Association of the East India Cotton Association, the Committee is entitled to nominate, from amongst the growers' representatives, three persons, whether members of the Association or not, not having dealings in forward contracts, as Directors of the Association. Rao Bahadur Sir Mahdaorao Deshpande, Mr. H. Sitarama Reddy and Sardar Rao Bahadur Bhimbhai Ranchodji Naik were elected by the Committee for the Cotton year under review.

The Committee is an Associate Member of the International Federation of Master Cotton Spinners' and Manufacturers' Associations.

3. MEETINGS.

Two meetings of the Indian Central Cotton Committee were held during the year under review. At the first meeting, which was held at Bombay on the 17th and 18th January, 1941, the Committee was mainly concerned with the consideration of the Indian cotton situation arising from the loss of markets in Europe and unsettled conditions in the Far East as a result of the war. There was a very full discussion on the subject which culminated in the following resolution being passed *nem. con.* :—

“The Indian Central Cotton Committee views with increased concern the low prices of Indian cotton, especially short staple cotton, mainly as a result of the loss of foreign markets in Europe and unsettled conditions in the Far East, and feels that the economic condition of the Indian cotton grower is in large part precarious and there are strong reasons for believing that it will further deteriorate unless prompt steps are taken to deal with the situation. The Committee accordingly recommends that the Government of India should take such steps, in the interests of the cotton grower, as may be necessary to relieve the situation. The Committee, in this connection, desires to make the following recommendations :—

- (1) The Government of India, in co-operation with manufacturing and trading interests, should take effective measures to expand the consumption of cotton goods, and cotton and woollen mixtures in this country and their export overseas. These should include *inter alia*
 - (a) directions to the Department of Supply and the Indian Stores Department that, except in such cases where it is absolutely essential to ask for cloth requiring the use of long staple imported cotton, specifications for their requirements should be so framed or altered as to encourage the use of Indian cotton ;
 - (b) representations to all Colonial and Empire Governments to ensure that India's cotton goods are admitted to those countries on the same terms and conditions as are accorded to British cotton goods ;
 - (c) the adoption of suitable measures for restricting the import of cotton goods and artificial silk yarn and piecegoods into this country ;
 - (d) the establishment by Government of a central export organisation with suitable arrangements for the inspection of goods before export and the deputation of a trade delegation to other countries for the purpose of carrying out propaganda and exploring the possibilities of introducing Indian cotton manufactures.

The second meeting of the year was held on the 18th and 19th July, 1941. This was the usual noonday meeting at which the progress reports on the various schemes financed by the Committee and programmes of work are examined. The progress made in connection with the resolution passed by the Committee at its previous meeting was reviewed at this meeting, and satisfaction was expressed that, as a result of the Committee's recommendations, the Supply Department had relaxed the specifications in regard to its requirements of textile goods, thus enabling Indian cotton to be used to a greater extent in the manufacture of such articles than had been possible before. As regards the question of setting up an export organisation for the purpose of extending the markets for Indian cotton and piecegoods, it was agreed that although, owing to various factors, the problem was not so acute as it was in January 1941, when the resolution referred to above was passed, it was nevertheless desirable to pursue the matter further and to work out the details of the proposed organisation. The replies received from certain provinces on the view expressed by the Committee that the most direct way of dealing with the problem of the disposal of India's surplus production of short staple cotton was to curtail the area under it, were also examined at this meeting, and it was noted that compulsory curtailment of acreage was not generally favoured owing to the difficulty of recommending an alternative cash crop to the cultivator and the fact that low prices in any one year automatically resulted in reduced acreage in the following year. At this meeting, the Committee also considered a proposal for the award of prizes for clean-picking of cotton, and decided that a scheme should be put up for studying the economics of this question by conducting experiments in certain areas. The question of widening the Broach Hedge Contract was also considered, and it

was agreed to recommend to the East India Cotton Association to examine, as a special case, the proposal of permitting the tendering of saw-ginned Indian American growths against this contract, at a very early date. Considerable discussion took place on the subject of the disparity in prices between fuzzy American cotton seed and *desi* seed in certain provinces, and the desirability of undertaking propaganda to dispel the prejudice against the use of the fuzzy type of seed, and it was decided that a suitable scheme for investigating the subject should be put up for the consideration of the Committee. Among the new schemes considered and approved at this meeting were the schemes for the improvement of Dharwar-American cotton, two marketing survey schemes—one for the Madras Province and the other for Gujerat and the adjoining Agencies and States of Kathiawar and South Rajputana—and a Model Projects Scheme for the extension of improved methods of cultivation in the Rohilkhand and Kumaon Circle of the United Provinces.

The January meeting of the Committee was followed by the Second Conference on Cotton Growing Problems in India. About fifty workers engaged in cotton research all over India attended the Conference and 45 papers, covering all aspects of cotton improvement,—“Cotton Genetics and Breeding,” “Cotton Agriculture,” “Cotton Technology,” “Cotton Statistics” and “Cotton Pests and Diseases”—were read and discussed. The proceedings of the Conference have since been published.

4. PROVINCIAL COTTON COMMITTEES.

The value of Provincial Cotton Committees in dealing with problems of provincial and local importance has been stressed on more than one occasion in the past; it is evident that such problems can be visualised best by those on the spot, and from this aspect the views of Provincial Cotton Committees are of much value in aiding the Indian Central Cotton Committee to arrive at decisions on the matters submitted for its consideration. The work done by these Committees in the Provinces, in which they have been actively functioning, has proved of material benefit to the Governments concerned.

CHAPTER II.

COTTON STATISTICS.

India ranks second amongst the cotton growing countries of the world ; on the average of the five years ending 1939-40, production of Indian cotton represented some 18% of the total world production, the share of the U. S. A. being 42%. The total area under cotton in India, during the year under review, was 22,902,000 acres, showing an increase of 1,322,000 acres over the figure of the previous year. With the exception of the United Provinces, where there was a reduction in the area, most of the other cotton growing provinces and States recorded increased acreage. The total estimated outturn for 1940-41 was 5,785,000 bales, against 4,909,000 bales, in 1939-40, the average yield per acre being 101 and 91 lbs. respectively. In all cotton growing Provinces and States other than Baroda (where the total production was lower despite the increased acreage), the outturn was either higher than or nearly equal to that of the previous year. The quantity of cotton pressed, including loose cotton consumed in mills in India during the year and the extra-factory consumption of cotton taken at 450,000 bales was 6,939,000 bales of 400 lbs. each.

Dissemination of information regarding the statistical position of Indian cotton constitutes an important function of the Committee. The price level of cotton, as of any other marketable commodity, is affected by changes in demand and supply, which are ultimately measured by the yard-stick of statistics. By studying carefully figures on the cotton acreage, production, and resultant prices in different countries of the world for periods in the past, it is possible for a cotton grower, dealer or manufacturer of cotton goods to work out certain laws which he may fit to his immediate conditions and thus be able to forecast, to some extent, the trend of future demand or future prices. Further, accurate statistics furnish a convenient and reliable means of studying the history of the cotton industry in different countries and in different parts of the same country. By the issue of bulletins, leaflets and press notes, from time to time, during the year, the grower and the trade were kept in touch with the statistical position of Indian cotton.

1. IMPROVEMENT IN STAPLE AND YIELD.

The ascertained area under improved strains of cotton was 6,617,000 acres or 29% of the total, against 28% in the previous year. That, with the

introduction and extension of superior varieties of cotton, there has been an improvement in the staple of the Indian cotton crop, will be apparent from the following table :—

CHANGE IN THE CHARACTER OF THE INDIAN COTTON CROP.

Indian cotton crop classified according to varieties and staple length.

(Based chiefly on the 'Estimates of Area and Yield of Principal Crops in India' and 'Cotton Forecasts' published by the Department of Commercial Intelligence and Statistics in India).

(Excludes Burma) (Quantities are in thousand bales* of 400 lbs. each).

Descriptions of cotton.	Average 1922-27.	Average 1935-40.	1940-41.	% increase (+) or decrease (—) of col. 4 over col.2.
(1)	(2)	(3)	(4)	(5)
<i>Short staple—below $\frac{3}{8}$".</i>				
(1) Bengals	905	1,219	1,176	
(2) Oomras	1,890	1,294	1,366	
(3) Central India	324	254	346	
(4) Broach (Part)	65	218	221	
(5) Dholleras	525	426	314	
(6) Kumpta & Upland (Part) ..	(a)	23	55	
(7) Bijapur & Bagalkot Jowari ..	(b)	149	33	
(8) Westerns (Part)			108	
(9) Warangal & Coconadas	49	27	33	
(10) Salems	30	22	5	
(11) Chinnapathi	39	43	1	
(12) Comillas			49	
Total Short staple { Quantity	3,827	3,675	3,707	—3
{ % on "Total-All Staples"	70	66	64	

* Statistical bales containing 400 lbs. of cleaned (lint) cotton.

(a) Included under item (19), separate figures not being available.

(b) " " " (20) " " " "

Descriptions of cotton.	Average 1922-27.	Average 1935-40.	1940-41.	% increase (+) or de- crease (—) of col. 4 over col. 2.
(1)	(2)	(3)	(4)	(5)
<i>Medium and Long staple—$\frac{3}{8}$" and above.</i>				
(13) Americans—Punjab and Sind (staple 1" and above) †.. ..	..	170	250	
(14) Americans—Punjab and Sind (staple below 1")	264	828	829	
(15) C. P. and Berar Verum .. ..	..	30	67	
(16) Hyderabad Gaorani	332	133	143	
(17) Broach (Part)	} 214	171	{ 2	142
(18) Surti				
(19) Kumpta & Upland (Part)	259	170	151	
(20) Westerns (Part)	} 251	69	{ 39	17
(21) White & Red Northern				
(22) Tinnevellies (including Karun- gannies)	155	141	159	
(23) Cambodias	147	170	210	
(24) Jarila .. ..	..	(c)	50	
(25) Buri .. ..	..	..	19	
Total—Me- dium & Long staple { Quantity	1,622	1,882	2,078	+28
{ % on "Total-All Staples"	30	34	36	
Total—All Staples	5,449	5,557	5,785	+6

(c) Included under item (2) separate figures not being available.

† Includes 'Punjab-American 289-F,' 'Sind Sudhar (Sind-American 289-F-1)' and 'Punjab-American 289-F/43.'

It will be seen that the proportion of cotton of staple length $\frac{3}{8}$ " and above to the total production increased from 30% in the quinquennium 1922-27 to 34% in the quinquennium 1935-40; the proportion in 1940-41 was 36% against 38% in 1939-40. The production of 'medium and long staple' cotton.

in 1940-41 increased by 456,000 bales or 28% as compared with 1922-27; under "short staple" there was a reduction of 120,000 bales or 3%. The production of cotton of staple length '1" and above,' which was practically nil in 1922-27, rose to 344,000 bales in 1940-41.

There has also been a noticeable improvement in the yield per acre, as will be seen from the following table, in which two sets of figures, one based on the official crop forecasts and the other on the figures of actual crop accounted for by mill consumption, exports and extra-factory consumption, are given :—

CHANGES IN UNIT YIELDS OF COTTON IN INDIA.

(Excludes Burma).

Year. (1st Sept.—31st Aug.)	Area (Thousand acres.)	Production Government estimates. (Thousand bales of 400 lbs. each).	Yield per acre (lbs.) Col. 3 Col. 2.	Approximate (commercial) crop. (Thousand bales of 400 lbs. each.)	Yield per acre calculated from ap- proximate (commercial) crop (lbs.) Col. 5 Col. 2. Col. 6
1	2	3	4	5	6
Average 1922-27 ..	24,723	5,449	87	*5,954	96
„ 1927-32 ..	24,738	5,206	84	*5,851	95
„ 1932-37 ..	23,912	5,315	89	*6,447	108
1937-38 ..	25,746	5,722	89	†6,370	99
1938-39 ..	23,482	5,051	86	†6,051	103
1939-40 ..	21,580	4,909	91	†5,884	109
1940-41 ..	22,902	5,785	101	†6,924	121

* Calculated from mill consumption (a) + exports (b) + extra-factory consumption (c). Variation in stocks has not, however, been taken into account.

(a) Mill consumption in Burma included up to 31st March 1937.

(b) Includes exports from Burma up to 1934-35.

(c) The new figure for extra-factory consumption, viz., 450,000 bales for the whole of India, based on enquiries conducted by the Committee, in selected areas, has been used throughout.

† Best estimate of the crop as arrived at by the Indian Central Cotton Committee in connection with the annual post-mortem examination of all-India cotton forecasts.

From the second set of figures given in Column 6, it will be seen that the average yield per acre rose from 96 lbs. in the quinquennium 1922-27 to 108

lbs. in the quinquennium 1932-37. The average yield in 1940-41 was 121 lbs. per acre against 109 lbs. in 1939-40.

A report on the estimated production of cotton according to staple length for 1940-41 season was issued in August 1941; the trade estimates of the crop were also presented in this report. Of the official estimate of 5,785,000 bales (compared with the trade estimate of 6,760,000 bales), 6% was of staple length 1" and above and 30% of staple length $\frac{3}{8}$ " to 31/32".

2. DEMAND FOR VARIOUS TYPES OF INDIAN COTTON.

Statistics relating to internal and export demand for various types of Indian cotton are compiled in the Secretary's office from information furnished on a voluntary basis. These are of considerable value, not only to the trade and industry but also to those entrusted with the responsibility of shaping and directing the cotton policy of the country. The statistics collected for the year 1940-41 are given in Appendices III and IV. Receipts at mills during the season were higher by 1,260,000 bales while exports were down by 260,000 bales, as compared with the previous season. Export demand for short staple varieties, particularly *Bengals*, *Central India* and *Dholleras*, showed a falling off, the total shrinkage in the exports of such cotton (below seven-eighths of an inch in staple) being 382,000 bales; the exports under long and medium staple increased by 122,000 bales.

3. STOCKS.

The information collected in respect of stocks held on the 31st August, 1941, is contained in Appendix V. Stocks of Indian cotton held in India by the mills and the trade at the end of the season 1940-41 increased by 721,000 bales over the previous year. Of the stocks of 1,219,000 bales held by the trade (excluding spinning mills) on August 31, 1941, against 1,039,000 bales on the corresponding date of the previous year, increases were recorded mainly under *Bengals* and *Oomras*.

As the season adopted for the cotton crop of the Madras Province is the year ending 31st January, figures of stocks held in the province on this date are collected annually in addition to the figures relating to the 31st August. The relevant figures for the 31st January, 1941, together with comparative details for previous years, are given in Appendix V.

As in the past, mills, trade associations, market committees and other authorities gave valuable assistance in the collection of figures of stocks of cotton held in the country at the end of the season. Much ground, however, still remains to be covered before the statistics can be claimed to be complete.

4. INDIAN MILL CONSUMPTION.

Figures of consumption of Indian cotton in mills in British India and Indian States for the years 1926-27 to 1940-41, based on the monthly statements issued by the Committee, are given in Appendix VI. The total consumption of Indian cotton in mills in India during the season under report, viz., 3,617,147 bales, showed an increase of 567,041 bales as compared with the previous season, and constitutes an all time record. Bombay Island alone accounted for about 61% of the increased consumption. The balance of 39% was distributed over other mill centres except Mysore where there was a slight reduction.

5. EXPORTS.

The exports of Indian cotton from British India during the season totalled 2,012,000 bales against 2,301,000 bales in 1939-40. On the average of the five financial years ending 1939-40, the value of cotton (including waste) exported from British India formed 39% of the total value of "Raw materials and produce and articles mainly unmanufactured" exported, and 18% of the total value of all merchandise exported.

6. STATISTICS OF COTTON PRESSED.

During the season 1940-41, 4,285,417 bales of cotton were pressed in British India and 1,782,868 bales in Indian States, making a total of 6,068,285 bales for all-India; the corresponding figures for 1939-40 were 3,600,197, 1,399,826 and 5,000,023 bales, respectively. For India as a whole, the average net weight per bale of cotton pressed during the season under report amounted to 393 lbs. against 391 lbs. in the previous season.

Under the provisions of the Cotton Ginning and Pressing Factories Act, 1925, every cotton pressing factory in British India is required to submit, to the prescribed authority, weekly returns of the number of bales pressed in it. Indian States having pressing factories co-operate in enforcing the submission of similar returns by factories situated within their limits. The all-India figures of cotton pressed are published weekly in the *Indian Trade Journal*.

In addition to the figures in running bales, their equivalents in statistical bales of 400 lbs. net are compiled by the Director General of Commercial Intelligence and Statistics and published monthly in the same Journal.

The suggestion of the East India Cotton Association that the statistics of cotton pressed should be compiled on the basis of the recognised trade descriptions as adopted in the revised trade classification* of Indian cottons, is under the consideration of the Government of India.

7. UNPRESSED (LOOSE) COTTON STATISTICS.

The statistics of cotton pressed do not account for the whole of the Indian cotton crop as, apart from the quantity utilised for extra-factory consumption, chiefly in the form of *kapas*, mills situated in cotton growing areas often use considerable quantities of ginned, unpressed cotton. Prior to 1936-37, the relevant statistics relating to unpressed cotton were compiled on a voluntary basis but from 1936-37 they are being collected under statute by an amendment of the form of return submitted by mills under the Indian Cotton Cess Act, 1923. Similar information for Indian States is obtained on a voluntary basis through the courtesy of the Darbars concerned. During the year, 523,001 bales of unpressed cotton were consumed in mills in India against 474,336 bales during the preceding year. The relevant figures for 1926-27 to 1940-41 are given in Appendix VI to this report.

8. STATISTICS¹ OF COTTON GINNED.

The figures of cotton pressed do not cover the entire crop as, apart from ginned unpressed cotton consumed in spinning mills for which figures are available, both ginned unpressed cotton and *kapas* are also utilised for domestic purposes, such as, hand-spinning, making of quilts, mattresses, etc., for which there are no reliable data. If, however, ginning returns could be instituted all that would be necessary for arriving at the actual crop would be to estimate the quantity of *kapas* used for domestic purposes. The two returns would at the same time serve as checks on each other. The submission of such returns is already in force in the Central Provinces and Berar and in the Bombay Province, while in Sind, the necessary rules under the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, have been framed. It was reported last year that the various other cotton growing provinces and States had been requested to take steps to amend the existing

* Appendix VII (page 155).